Interreg Italy - Croatia RESPONSe

EUROPEAN UNION

DELIVERABLE D4.1

State-of-the-art actions for climate change adaptation and mitigation in the Adriatic basin

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Project key facts

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V 2.2	09.04.2020	PP1	Correction of the draft
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V 3.0	29.04.2020	PP3	Preparation of the final version

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1 EXECUTIVE SUMMARY

The Deliverable "D4.1 - State-of-the-art actions for climate change adaptation and mitigation in the Adriatic basin", shows the results of an original methodology conceived to collect the best available climate change adaptation and mitigation measures. This work has been carried out in the context of the Interreg Italy-Croatia RESPONSe project, as part of "Activity 4.1 – Adaptation in the Adriatic basin: state-of-the-art" of the “WP4 - Adriatic region adaptation menu”.

1.1 SCOPE

The scope of "Activity 4.1 – Adaptation in the Adriatic basin: state-of-the-art" is to collect the best practices necessary to embed climate change adaptation and mitigation measures into planning processes of Adriatic macro-areas, taking account of the outputs of the climate change analysis carried out in “WP3 - Harmonization of the climate change analysis and monitoring systems”.
To achieve this goal, the most state-of-the-art climate change adaptation and mitigation actions envisioned or implemented at European, national and regional governance levels in the Adriatic basin were collected, analyzed and capitalized with a top-down approach. Moreover, if available, an additional sub-regional level of detail has also been added to the analysis. Finally, the collected strategies have been compared to the current and future climate trend at Adriatic macro-area scale (Northern, Central and Southern Adriatic), in order to prioritize adaptation and mitigation efforts based on the actual climate change effects.

1.2 AUDIENCE

This Deliverable is a public report aimed particularly at the public authorities and the scientific community as the only example of a comprehensive data collection of adaptation and mitigation measures for the Adriatic basin. The report will be made available on the RESPONSe web page.

1.3 STRUCTURE

This Deliverable is structured as follow: (i) introduction to the report; (ii) methodology adopted to gather information; (iii) description of the collected adaptation and mitigation strategies by geographical area; (iv) discussion and comparison of the collected adaptation and mitigation strategies by geographical area; (v) final considerations on the main findings.

2 INTRODUCTION

Life on Earth is deeply influenced by weather and climate: they are essential for the daily experiences of human beings as well as for health, food production and well-being (IPCC, 2001); but it is also important to remember what has been stated by the Intergovernmental Panel on Climate Change (IPCC), following scientific studies, in the Second Assessment Report (IPCC, 1996) (hereinafter SAR), that is human activities can influence the climate, too. The IPCC (2001) defined the climate system an interactive system consisting of five major components: the atmosphere, the hydrosphere, the cryosphere, the land surface and the biosphere, strained or influenced by various external forcing mechanisms, the most important of which is the Sun. Human activities can be considered an external force (IPCC, 2001). The interaction among those components is fundamental to keep the system alive, and they retain the same weight to grant the equilibrium of the system: for example, if the concentration of greenhouse gases increases dangerously, or similarly the amount of aerosol in the atmosphere, the result is a change in the radiative forcing (IPCC, 2001), hence triggering an alteration of the previous state. The Industrial Revolution represents the beginning of the anthropogenic perturbation to the atmospheric composition (IPCC, 2001), whose effects are most visible through extreme events and climate change effects. Therefore, the impact of climate change, as a common global problem, can be addressed with the mitigation of greenhouse gases and the adaptive capacities existing at national and subnational level (Nalau, 2015). The IPCC (2001) defines these two actions as:

- Mitigation: an anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases;

- Adaptation: adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

The impacts of climate change are unequivocal (IPCC, 2007), and have become one of the most severe challenges to sustainable development of the global economy, causing widespread concerns of the international community (Yu et al. 2013). Furthermore, the impacts of climate change have an intersectoral nature, therefore the integration and coordination of policies are widely considered an intrinsic part of the success of measures to address these concerns (European Commission, 2009).

All European regions will be increasingly affected by the future impacts of climate change, therefore, the first response of the European Union was to enhance the reduction of greenhouse

gas emissions, marking a fundamental role at international level (Biesbroek, 2010). Adaptation measures only appeared in political strategies following the growing evidence of climate impacts, for example with the melting of Arctic sea ice and mountain glaciers, the thaw of permafrost, extreme heat waves, floods, storm damages (Biesbroek, 2009). The European Union (EU) initially limited itself to achieving the Kyoto objectives by playing a rather limited role in adaptation strategies (Biesbroek, 2010). Subsequently, the EU published the Green Paper (2007) and the White Paper (2009) with indications for adaptation to climate change, coming to the conclusion that safeguarding the environmental sector is a challenge that requires the participation and cooperation of a multitude of sectors (Biesbroek, 2010). This translates into the fact that climate risk management and planning activities require coordination at national, or regional, or local level (Adger et al.,2005).

The focus of this report is to study the existing Strategies at European, National and Regional scale, to compare them, and to support the definition of a check-list of the common points that could be fundamental for the development of an effective mitigation or adaptation Strategy. In fact, the study focuses on the marine and coastal areas of the Adriatic Sea, because the impacts of climate change increased natural risks for such areas. Furthermore, identifying, preparing for and responding to the impacts of climate change is a necessity and a priority for the local governments and authorities.

3 METHODOLOGY

One of the main challenges faced by the Interreg project RESPONSe is specifically that of implementing a strategy to deal with the impacts of climate change in the areas bordering the Adriatic Sea. For this reason, Activity 4.1 of the project aimed to collect the best practices necessary to embed climate change adaptation and mitigation measures into planning processes of Adriatic basin. In this report, the current status and the development of mitigation and adaptation Strategies in Europe, in Italy and Croatia Countries, and in the Adriatic macro-areas (North, Centre, South) has been assessed. Friuli Venezia Giulia, Marche, and Apulia Regions have been selected as representative of the three macro-areas for the Italian side, while Primorsko-Goranska, Šibensko-Kninska, and Dubrovačko-Neretvanska Counties have been selected as representative of the three macro-areas for the Croatian side (Figure 1). These consist in the Regions/Counties in which are placed the pilot municipalities of the project.

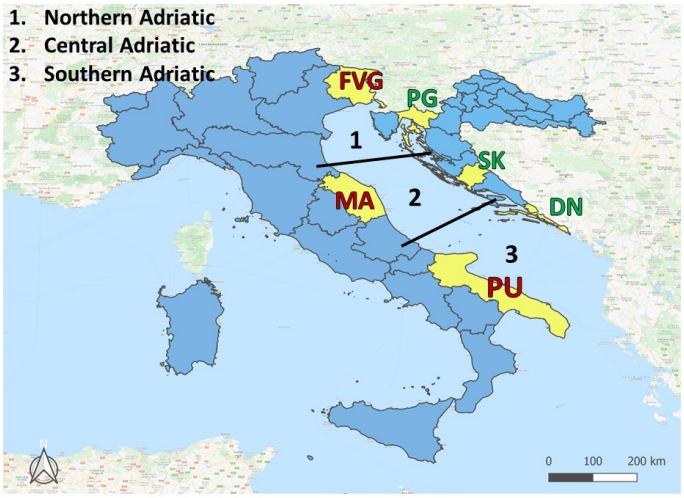

Figure 1. - Macro-areas of the RESPONSe project

This review will represent a reference for the actions to be undertaken to implement a mitigation and adaptation Strategy in a specific area. In this way, the project represents a first step for further collaborative research in this emerging area, in order to improve the exchange of experiences, establish a dialogue between countries and improve social learning (Swart et al., 2009).

The criteria selected to assist in the selection of the Strategies to be analysed are simple: they have to deal with climate change, and adaptation and mitigation actions. Contributing partners were asked to analyse their own representative area and select, on the basis of the above-mentioned criteria, the National and Regional Strategies. Whenever available the Sub-regional Strategies has also been included into the collection. A pre-compiled format was realised to standardise the collected information from all the Strategies scanned, and to have a guide during the working analysis. This format was uploaded on-line, so that every partner could view all the compiled formats and the commissioned partner could identify the common points between the different Strategies.
The questions of the format are divided into different semantic parts (ANNEX). It starts with general information, such as the name and the type of the Strategy, the type of document that refers to the Strategy, the indication of the agency that issued the strategy, the year of issue and the geographical area included. The second part represents the context, that includes the general objective, the description and the motivating factors. The following questions allow to analyse the relevance, asking if there are: climate scenarios and projections basis, assessments of vulnerabilities/climate risks, transboundary risks, participation of scientific and bridging organisations. The fourth part is the implementation, that deals with vulnerable sectors and topics of the Strategy, time span, type of envisioned measures and their description, preferred policy instruments. Afterwards, there is the interaction part, with the analysis concerning stakeholders, their roles, responsibilities and type of communication. Following there is the coherence section, meant to understand whether the Strategy is integrated in new or existing policies, and following it is possible to find the efficiency part. This one treats the expected initial/end dates of implementation, state of implementation, reason of deviation if any, funding and allocated budget. The section of the achieved results analyses if and how the outcomes are evaluated, if there is a nominated body in charge for the monitoring, the main strengths, the main weaknesses and the lesson learnt. The last part is the references where it is possible to find the link to the Strategies analysed.

In the chapters below, the outcomes of every European, National, Regional and Sub-regional analysis are presented.

4 ADAPTATION AND MITIGATION STRATEGIES COLLECTED

The study led to the analysis of 65 European, National, Regional and Sub-regional Strategies of the Adriatic basin: 2 EU Strategies, 3 Italian Strategies, 2 Croatian Strategies, 34 Regional Strategies and 24 sub-regional Strategies.

At the EU level, 1 Strategy is devoted to adaptation and 1 to mitigation. The same is for the Croatian Strategies, while Italy issued 1 adaptation and 2 mitigation Strategies.

The Regional Strategies collected are 31 for Italy and 3 for Croatia, distributed among Northern, Central, and Southern Adriatic (Figure 2). Friuli Venezia Giulia Region issued 13 Strategies, including 5 adaptation, 5 mitigation and 3 adaptation and mitigation Strategies. Marche Region issued a total of 10 Strategies, including 1 adaptation, 3 mitigation and 6 adaptation and mitigation Strategies. Apulia Region issued 8 Strategies, including 3 adaptation and 5 mitigation Strategies. Primorsko-Goranska County adopted 1 mitigation Strategy, Šibensko-Kninska County 1 adaptation Strategy and Dubrovačko-Neretvanska County 1 mitigation Strategy. Therefore, the Northern Regional Strategies analyzed are 14, the Central Regional Strategies are 11 and the Southern Regional Strategies are 9 (Figure 2).

In the following paragraphs, the European, National, and Regional Strategies collected are presented.

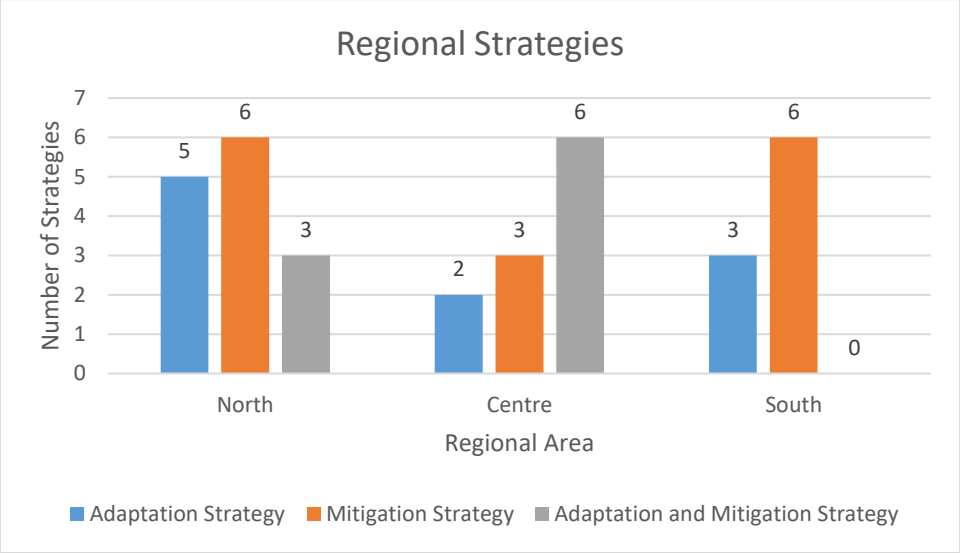

Figure 2. - Regional Strategy Histogram

4.1 EUROPEAN STRATEGIES

4.1.1 GENERAL INFORMATION

Name of the Strategy

1) EU Adaptation Strategy (EU Adapt)
2) EU Emissions Trading System (EU ETS)

Type of Strategy

	Adaptation	Mitigation
EU Adapt	X	
EU ETS		X

Type of document that refer to the Strategy

1) European Strategy
2) European Strategy

Agency that issued the Strategy

1) European Commission
2) European Commission

Year of issue

1) 2013
2) 2005

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) European Members (28 countries)
2) European Members (28 countries) plus Iceland, Liechtenstein and Norway

4.1.2 CONTEXT

General objectives of the Strategy

1) The general objective of the Strategy is to contribute to a more climate-resilient Europe by enhancing the preparedness and capacity to respond to the impacts of climate change at local, regional, national and EU levels, developing a coherent approach and improving coordination.
2) The general objective of the Strategy is to reduce greenhouse gas emissions cost-effectively of 20% by 2020 and at least 40% by 2030 (compared to 1990 levels).

Description of the Strategy

1) The Commission encourages all Member States to adopt comprehensive adaptation strategies (15 had strategies as of mid-2013) and will provide guidance and funding to help them build up their adaptation capacities and take action. The Commission will also support adaptation in cities by launching a voluntary commitment based on the Covenant of Mayors initiative. The Commission will address gaps in knowledge about adaptation and will develop the European Climate Adaptation Platform (Climate-ADAPT) as the 'one-stop shop' for adaptation information in Europe.

Furthermore, will be promoted adaptation in key vulnerable sectors through agriculture, fisheries and cohesion policy, ensuring that Europe's infrastructure is made more resilient, and encouraging the use of insurance against natural and man-made disasters.

2) The strategy is based on the 'cap and trade' principle. The overall volume of greenhouse gases that can be emitted each year by the power plants, factories and other companies covered by the system is subject to a cap set at EU level. Within this Europe-wide cap, companies receive or buy emission allowances which they can trade if they wish; each allowance gives the holder the right to emit one ton of CO_2 or the equivalent amount of two other powerful greenhouse gases, N_2O and PFCs. Allowances can be used only once. Companies have to surrender allowances for every ton of CO_2 (or the equivalent amount of N_2O or PFCs) covered by the EU ETS that they emitted in the previous year. Heavy fines are imposed if they do not surrender enough allowances to cover their emissions. Companies may receive some allowances from governments for free. To cover the rest of their emissions, they need to do either, or a mixture of, the following: buy additional allowances draw on any surplus allowances they have saved from previous years. Within limits, they can also buy credits from certain types of approved emission-saving projects around the world.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
EU Adapt	X	X								X	
EU ETS		X					X	X		X	

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…

- UN = United Nation Summits/Reports

4.1.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) Yes. The strategy is based on the observed and projected climate change and impacts for the main biogeographical regions in Europe (EEA, 2012).
2) Yes. The strategy is based on the greenhouse gas reduction targets reported on the Kyoto Protocol.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes. The Commission will promote EU-wide vulnerability assessments, taking into account the cross-sectoral EU overview of natural and man-made risks.
2) No.

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) Yes. It is highlighted how climate risk operates across boundaries, because of the myriad of complex and global interconnections between people, ecosystems and economies (for example, trade, international financial flows, migration and security).
2) No. In this strategy transboundary risks are not relevant since one of the main aims is involving many companies in the carbon market.

Does any scientific organization/institution participate in the Strategy? Which ones?

1) Yes. The Joint Research Centre.
2) No.

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) Yes. The Copernicus Climate Change Service (C3S).
2) Yes. The Directorate-General for Climate Action (DG CLIMA), the European Energy Exchange (EEX), the common auction platform, the Intercontinental Exchange (ICE) as the UK auction platform.

4.1.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
EU Adapt	X			X				X				X		X					
EU ETS												X		X		X			

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought

- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
EU Adapt			X	
EU ETS			X	

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
EU Adapt	X	X	X	
EU ETS		X	X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Encourage all Member States to adopt comprehensive adaptation strategies; provide LIFE funding to support capacity building and step up adaptation action in Europe (2014-2020); introduce adaptation in the Covenant of Mayors framework (2013/2014); bridge the knowledge gap; further develop Climate-ADAPT as the 'one-stop shop' for adaptation information in Europe; facilitate the climate-proofing of the Common Agricultural Policy (CAP), the Cohesion Policy and the Common Fisheries Policy (CFP); ensuring more resilient infrastructure; promote insurance and other financial products for resilient investment and business decisions.
2) Put a price on carbon and give a financial value to each tons of emissions saved (carbon trading market); introduce an EU-wide cap on emissions (reduced by 1.74% each year) and a progressive shift towards auctioning of allowances in place of cost-free allocation; bring heavy power generation and manufacturing industry and operators of flights to invest in clean technologies and low carbon solutions.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
EU Adapt		X	X	X	
EU ETS		X			

4.1.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Member States; regional and local authorities and decision makers; financial institutions; private business and industries in the area of energy, transport and buildings; civil society; conservation practitioners; insurers.
2) Power and heat generation companies; energy intensive industries including oil refineries, steel works and production of iron, aluminum, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals; civil aviation.

What are their roles and responsibilities?

1) Member States are encouraged to formulate their own adaptation strategies, which will be evaluated by the European Commission, to identify adaptation knowledge gaps and the relevant tools and methodologies to address them; regional and local authorities and decision makers are encouraged to adopt local adaptation strategies (e.g. Covenant of Mayors), to integrate them into the Common Agricultural Policy (CAP), the Cohesion Policy and the Common Fisheries Policy (CFP) and to organize awareness-raising activities; Member States and regions can also use funding under the 2014-2020 Cohesion Policy and CAP to address knowledge gaps, to invest in the necessary analyses, risk assessments and tools, and to build up capacities for adaptation; authorities and decision makers, civil society, private business and conservation practitioners have to ensure the full mobilization of ecosystem-based approaches to adaptation; relevant industries need to work on infrastructure and physical assets to climate-proof vulnerable investments; insurers are encouraged to unleash the full potential of insurance pricing and other financial products for risk-awareness prevention and mitigation and for long-term resilience in investment and business decisions.
2) Their responsibility is to respect the carbon market's "rules", and so handing in used allowances; companies operating in the sectors covered have to participate to the EU ETS, since it is mandatory.

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other

EU Adapt	X	X	
EU ETS	X		

4.1.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) Yes. The 2014-2020 LIFE funding programme for the environment; the Common Agricultural Policy; the Cohesion Policy; the Common Fisheries Policy; The Green Paper on the insurance of natural and man-made disasters.
2) No.

4.1.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2013-2020
2) 2005-2030 and beyond

State of the implementation

	Not started	In progress	Delayed	Completed	Other
EU Adapt		X			

EU ETS		X			

Reasons of deviations, if any

1) None
2) None

Funding

1) European Union
2) Not applicable

Allocated budget [€]

1) The EU institutions have agreed that at least 20 % of the €960 billion EU budget for 2014-2020 should be spent on climate mitigation and adaptation, some three times the previous level. The LIFE environment fund for the period will have a new €864 million climate sub-programme for mitigation and adaptation.
2) The Fund may amount to about €10 billion, depending on the carbon price. In parallel to the Innovation Fund, the EU ETS provides the main long-term incentive for these technologies to be deployed.

4.1.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other

EU Adapt	X			
EU ETS	X			

How are the outcomes of the Strategy evaluated?

1) The Commission published an evaluation of the strategy in November 2018. The evaluation was accompanied by a public consultation from December 2017 to March 2018 (page available in most EU languages). The analysis resulted in a report on lessons learned and reflections on improvements for future action, accompanied by a staff working document presenting the evaluation in detail.
2) The accurate accounting of all allowances issued is assured by a single Union registry with strong security measures. The registry keeps track of the ownership of allowances held in electronic accounts, just as a bank holds a record of its customers and their money.

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) European Commission
2) The Union Registry

What are identified as the main strengths of the Strategy?

1) The strategy has delivered on its objectives, with progress recorded against each of its eight individual actions. The main strengths were collaboration between different policies and platforms and involvement of local authorities and communities to be part of the Member States' discussion, according to the bottom-up approach.
2) The need to draw on their reserves of allowances and credits creates a permanent incentive for companies to reduce their emissions by investing in more efficient technology or shifting to less carbon-intensive energy sources; companies can also sell allowances and credits, for instance if

they judge they have more than they are going to need: this allows them to choose the most cost-effective options to address their emissions.

What are identified as the main weaknesses of the Strategy?

1) The strategy's actions could be better integrated with each other. Links between actions did occur spontaneously but could be better identified and exploited. Equally, the strategy should better integrate the international dimension of adaptation to synchronize with global collective policy and actions on sustainable development, biodiversity and disaster risk reduction, to name just a few. The strategy promoted adaptation plans at all levels, but was less effective on the carrying out and monitoring of those plans in Member States. On the number of local adaptation strategies, progress has been slower than envisaged in 2013, and differs between Member States.
2) During the first trading period the number of allowances, based on estimated needs, turned out to be excessive; during the second trading period the number of allowances was reduced by 6.5%, but the economic downturn depresses emissions, and thus demand, by even more: this led to a surplus of unused allowances and credits which continues to weigh on the carbon price; "carbon leakage" refers to the situation that may occur if, for reasons of costs related to climate policies, businesses transfer production to other countries which have laxer constraints on greenhouse gas emissions: this could lead to an increase in their total emissions.

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) The strategy has been a reference point to prepare Europe for the climate impacts to come, at all levels. The Commission will continue working towards its objectives. The EU level adaptation strategy is still highly relevant and adds value to national, regional and local adaptation efforts while remaining cost-effective. The strategy, a policy instrument with little administrative implications for most stakeholders, has succeeded in focusing decision-makers on the need to prepare for climate hazards. The strategy has acted as a reference point, i.e. focusing and catalyzing action at other levels of governance. In addition, it has successfully channeled efforts to continue to ensure that EU level policies and budgets integrate climate change considerations.
2) The EU ETS has put a price on carbon and proved that trading in greenhouse gas emissions works. The carbon market creates an incentive to invest in technologies that cut emissions and drives also clean investments in developing countries. The first trading period successfully established the free trading of emission allowances across the EU, put in place the necessary infrastructure and

developed a dynamic carbon market. The environmental benefit of the first phase may be limited due to excessive allocation of allowances in some Member States and some sectors, due mainly to a reliance on emission projections before verified emissions data became available under the EU ETS. When the publication of verified emissions data for 2005 highlighted this “over-allocation”, the market reacted as would be expected by lowering the market price of allowances. The availability of verified emissions data has allowed the Commission to ensure that the cap on national allocations under the second phase is set at a level that results in real emission reductions. Besides underlining the need for verified data, experience so far has shown that greater harmonization within the EU ETS is imperative to ensure that the EU achieves its emissions reductions objectives at least cost and with minimal competitive distortions. The need for more harmonization is clearest with respect to how the cap on overall emission allowances is set. The first two trading periods also show that widely differing national methods for allocating allowances to installations threaten fair competition in the internal market. Furthermore, greater harmonization, clarification and refinement are needed with respect to the scope of the system, the access to credits from emission-reduction projects outside the EU, the conditions for linking the EU ETS to emissions trading systems elsewhere and the monitoring, verification and reporting requirements.

4.1.9 REFERENCES

1) https://ec.europa.eu/clima/sites/clima/files/docs/eu_strategy_en.pdf
2) https://ec.europa.eu/clima/policies/ets_en#tab-0-1

4.2 NATIONAL STRATEGIES: ITALY

4.2.1 GENERAL INFORMATION

Name of the Strategy

1) National Adaptation Strategy (NAS)
2) National Plan for Adaptation to Climate Change (NPACC)
3) Proposal of National Integrated Planning for Energy and Climate (NIPEC)

Type of Strategy

	Adaptation	Mitigation
NAS	X	
NPACC		X
NIPEC		X

Type of document that refer to the Strategy

1) National Decree
2) National Plan
3) National Strategy

Agency that issued the Strategy

1) Italian Ministry of the Environment and Land and Sea Protection (MATTM)
2) Italian Ministry of the Environment and Land and Sea Protection (MATTM)
3) Ministry of Economic Development, Ministry of the Environment and Protection of the Territory and the Sea, Ministry of Infrastructure and Transport

Year of issue

1) 2015
2) 2016
3) 2018

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Italy
2) Italy
3) Italy

4.2.2 CONTEXT

General objectives of the Strategy

1) The objective of the strategy is to provide a framework for adapting to the consequences of climate change and laying the foundations for: improve current knowledge on climate change and theirs impacts; describe the vulnerability of the territory and the adaptation options; promote participation; support awareness and information on adaptation to climate change; specify the tools to use.
2) The general objective of the strategy is to offer a support tool to national, regional and local institutions for the identification and selection of the most effective actions in the various climatic areas in relation to the criticalities that characterize them the most and for the integration of criteria of adaptation in existing procedures and tools.
3) The general objective of the strategy is adaptation to European energy and environment objectives, reduction of greenhouse gas emissions.

Description of the Strategy

1) The strategy initially considers the expected impacts of climate change and the main vulnerabilities in Europe and the Mediterranean; then it focuses on the expected impacts of climate change and the main vulnerabilities in Italy by referring to the sectors of socio-economic and environmental importance that are most vulnerable to climate change. Finally, it assesses the state of knowledge of the impacts and vulnerabilities of these sectors and any intersectoral aspects.
2) The general objective is declined in four specific objectives: limiting the vulnerability of natural, social and economic systems to the impacts of climate change, increasing their adaptation capacity, improving the exploitation of any opportunities and facilitating the coordination of actions at different levels.
3) Diffusion of renewables and energy efficiency, related to the reduction of polluting and climate-changing emissions, to the improvement of energy security and to the economic and employment opportunities for families and the production system. The approach intends to put the citizen more and more at the center, even as a prosumer, and businesses, especially medium and small ones. At the same time, it will be necessary to assess the compatibility between the energy and climate objectives and the objectives of protecting the landscape, air quality and water bodies, safeguarding biodiversity and protecting the soil.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
NAS	X	X		X						X	
NPACC	X	X		X						X	
NIPEC	X	X								X	

Legend:

- Ext = Extreme weather events/impacts

- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…
- UN = United Nation Summits/Reports

4.2.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) Yes. It is based on the reports of IPCC, EEA, APAT/ISPRA, ENEA, FEEM, CMCC and other studies on economic impacts (McCallum, 2013; Carraro, 2008).
2) Yes.
3) Yes.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes. Increasing of temperatures, heat waves, decreasing of average precipitations, drought, ice melting, sea level rise, human health, biodiversity, water resources, geo-hydrological risk, socio-economic impacts.
2) Yes. A synthetic risk index for the Italian territory has been calculated by integrating the overall index of potential impacts (deriving from the combination of hazard indicators with those of exposure and sensitivity) and that relating to adaptive capacity.

3) Yes. Particularly the most vulnerable people, such as the elderly and children, are also considered in the proposed plan.

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) No.
2) Yes. Cooperation between States is recognized necessary.
3) Yes. Coordination with other Countries and organization on intraday markets and that of cross-border balancing markets.

Does any scientific organization/institution participate in the Strategy? Which ones?

1) Euro-Mediterranean Center on Climate Change (CMCC) coordinated a Technical Table composed of around one hundred national experts from universities, research institutes and foundations.
2) National System for Environmental Protection (SNPA), National Research Council (CNR), Institute of Biometeorology (IBIMET) and Institute of Sciences of the Atmosphere and Climate (ISAC), National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), European Mediterranean Center for Climate Change (CMCC), Ca 'Foscari University of Venice, University of Bologna, Marche Polytechnic University, International Center for Environmental Monitoring (CIMA) Foundation, University of Bari, University of Milan-Bicocca, Council for research in agriculture and analysis of the agricultural economy (CREA), Institute for Environmental Protection and Research (ISPRA), National Institute of Oceanography and Experimental Geophysics Trieste (OGS), International Center for Studies on Tourism Economics, Uniroma3, Higher Institute for Conservation and Restoration (ISCR).
3) No.

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) No.
2) No.
3) No.

4.2.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
NAS	X	X	X		X		X	X	X		X	X		X	X	X	X	X	forests, mountainous areas
NPACC	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
NIPEC	X										X	X	X			X			residential, waste, tertiary, forests

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy

- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
NAS			X	
NPACC			X	
NIPEC			X	

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
NAS	X	X	X	
NPACC	X	X	X	
NIPEC	X			

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) The actions are divided into two types: to be implemented by 2020 and to be implemented beyond 2020, and for each period of time they have specified the soft, gray and green action to undertake for the action sectors. Generally, the short time action concern to the planning, evaluation, optimizing management of resources, actions and planning of economic instruments for managing climate risk. The long time action provides for the definition of specific indices of climate change variables, the adoption of new codes and measures related to the different sectors, the adoption of the most sophisticated information and technology systems and the implementation of awareness campaigns. (annex 3 to the decree - Short and long time actions).
2) A Soft Strategy: to plan the information strategy through research and evaluation, monitoring, dissemination, awareness and training; organizational and participatory processes selecting the genotypes and genetic varieties, organizing the civil protection at local level, diversifying the corporate strategies, controls and inspections; creating tables, committees, networks; at the level of governance, legislative and regulatory adjustments, plans and strategies and economic and financial instruments must be implemented; at the end, Guidelines are necessary. Green and Grey strategy: adjustment and improvement actions of facilities and infrastructures planning the reforestation and the afforestation; solutions based on ecosystem services planning the conservation, reconstruction and re-naturalization of coastal areas, considering the urban construction.
3) Focus on: strengthen the spread of low-emission and renewable technologies; promote technological innovation to develop new instruments with high potential; improve energy efficiency by containing system costs; arriving at the phase-out of coal-fired thermal plants by 2025 in complete safety; guarantee the safety and flexibility of the gas and electricity networks; clear the gap on electricity prices for households and businesses; reduce the risk of relocation of more energy-intensive companies. Particularly: strategic environmental assessment procedures (VAS) are envisaged in each sector. The reduction of emissions in the waste sector is mainly linked to the increase in separate waste collection and the subsequent recycling. For the energy sector, Italy has planned the gradual cessation of electricity production with coal by 2025, with a first significant step to 2023, offset, in addition to the strong growth of renewable energy, by a plan of infrastructural interventions to be carried out in the coming years. As regards the measures in the agricultural and zootechnical fields, the Regions have the obligation to apply practices aimed at reducing the emissions produced by agricultural activities, such as the coverage of slurry storage facilities, the

application of correct methods of spreading slurry and the burying of soil surfaces subject to the application of fertilizers, where such practices are technically feasible and economically sustainable. As far as the forestry sector is concerned, the aim is to know Italian forests in a timely manner, and training for operators to recognize the state of abandonment of the forest and forest management and planning guidelines is mandatory. All sectors are expected to reduce some atmospheric pollutants such as sulfur dioxide, nitrogen oxides, non-methane volatile organic compounds, ammonia and fine particulate matter.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
NAS				X	
NPACC	X			X	
NIPEC	X			X	

4.2.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Ministry of Environment and Land and Sea Protection, Ministry of Agriculture and Forestry Policies, Ministry of Infrastructure and Transport, Ministry of Health, Ministry of Cultural and Environmental Heritage, Ministry of Education, University and Research, Ministry of Economic Development, Ministry for Regional Affairs, Tourism and Sport, Civil Protection, Committee of Regions, National Association of Italian Municipalities and Union of Italian Provinces, European Mediterranean Center for Climate Change (CMCC).
2) Ministry of Environment and Land and Sea Protection.

3) Ministry of Economic Development, Ministry of Environment and Land and Sea Protection, Ministry of Infrastructure and Transport.

What are their roles and responsibilities?

1) Each representative of the ministries involved attended the Institutional Table convened by the Ministry of Environment and Land and Sea Protection (MATTM). The MATTM is the person responsible at national level for climate policies and has managed the definition of the "National Strategy for adaptation to climate change" (SNAC) to be implemented through an Action Plan / Sectoral Action Plans. The CMCC has managed the technical-scientific coordination to acquire the information necessary for the development of SNAC.
2) The Ministry of Environment and Land and Sea Protection (MATTM) realizes the PNACC on the base of the NAS.
3) Drafting of the plan to adapt them to European energy and climate regulations.

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
NAS	X	X	
NPACC	X		
NIPEC	X		

4.2.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) Yes. Decree of the Climate and Energy Director General of June 2015.

2) Being developed.
3) Resolution of the Council of Ministers of 9 April 2019.

4.2.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2015-2020 and beyond
2) 2016-2050
3) 2018-2050

State of the implementation

	Not started	In progress	Delayed	Completed	Other
NAS				X	
NPACC		X			
NIPEC					the program has not yet been approved by the EU

Reasons of deviations, if any

1) None
2) None
3) None

Funding

1) The Strategy refers to European funds that are going to be established in the National Adaptation Plan.
2) Some actions have already been taken and the funding comes from Projects.
3) EU.

Allocated budget [€]

1) Not defined.
2) € 372.000 Improvements to the Serio River: the project, funded mainly by the Cariplo foundation, resorted to naturalistic engineering techniques to improve the river functionality of the Serio river in Lombardy. € 80 mld Horizon Program 2020 for scientific research. € 198 M INTERREG Alcotra (Italy-France) for planning strategy. € 97 M Maritime INTERREG (Italy-France) for pretection and evaluation of the environmental heritage. € 30 M INTERREG Italy-Switzerland) for tools for cross-border water resources. € 24 M INTERREG Italy-Austria for habitat connection and enhancement. € 39 M INTERREG Italy-Slovenia promoting the strategies and action plans that enhance energy efficiency. € 188 M INTERREG Italy-Croatia for marine innovations. € 81 M INTERREG Italy-Greece for the safeguarding marine and terrestrial biodiversity. € 23 M INTERREG Italy-Malta for the safeguarding marine and terrestrial biodiversity. € 139 M INTERREG AlpineSpace for sustainable mobility actions. € 163 M INTERREG CentralEurope for energy efficiency of public infrastructure. € 60 M INTERREG Adrion for Sustainable protection and enhancement of cultural and natural heritage. € 125,80 INTERREG Med for energy efficiency of public buildings. € 109 M ENI-CBC MED for actions aimed at saving and sustainable management of water resources. € 92 M IPA-CBC Italy-Albania-Montenegro for actions to safeguard biodiversity and reduce environmental risk. € 33 M INTERREG Italy-Tunisia for environmental protection. € 19,7 Mld European Investment Bank for transport infrastructure. € 500 M Extracted plan for the 2015-2020 National Action Plan. € 140 M Program for the methanization of Southern Italy. € 90 M Reclamation and Conversion of Sites of National Interest. € 1 Billion Level "Culture and Tourism". € 60 M Redevelopment of school buildings. And many other reported in the PNACC Table 2.4-1 Funds available for financing climate change adaptation actions in Italy.
3) € 180 billion for energetic national system between 2017-2030.

4.2.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
NAS	X			
NPACC	X			
NIPEC	X			

How are the outcomes of the Strategy evaluated?

1) Monitoring and reporting.
2) Monitoring.
3) Monitoring and evaluation.

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) Institutional Administrations.
2) Ministry of Environment and Land and Sea Protection (MATTM) at the National level and Regional Environmental Protection Agencies (ARPAs) at the regional and local level.
3) Ministry of Environment and Land and Sea Protection (MATTM).

What are identified as the main strengths of the Strategy?

1) This Strategic Document represents the reference point for the implementation in our Country of adaptation actions and measures coordinated by the competent institutional authorities.

2) Common Guideline
3) -

What are identified as the main weaknesses of the Strategy?

1) -
2) Poor coordination of the authorities involved and wide range of the sectors concerned.
3) -

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) -
2) -
3) -

4.2.9 REFERENCES

1) https://www.minambiente.it/sites/default/files/archivio/allegati/clima/strategia_adattamentoCC.pdf
2) https://www.minambiente.it/sites/default/files/archivio_immagini/adattamenti_climatici/documento_pnacc_luglio_2017.pdf
3) https://www.mise.gov.it/images/stories/documenti/Proposta_di_Piano_Nazionale_Integrato_per_Energia_e_il_Clima_Italiano.pdf

4.3 NATIONAL STRATEGIES: CROATIA

4.3.1 GENERAL INFORMATION

Name of the Strategy

1) Climate Adaptation Strategy in the Republic of Croatia for the period to 2040, with a view at 2070 (CAS)
2) Low Carbon Development Strategy of the Republic of Croatia – white book for public consultations (LCDS)

Type of Strategy

	Adaptation	Mitigation
CAS	X	
LCDS		X

Type of document that refer to the Strategy

1) National strategy, adopted by Croatian Parliament on the 7th of April 2020
2) National strategy, draft version in the public reading phase

Agency that issued the Strategy

1) Ministry of Environment and Energy

2) Ministry of Environment and Energy

Year of issue

1) 2020
2) 2020

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Croatia
2) Croatia

4.3.2 CONTEXT

General objectives of the Strategy

1) The objective of the strategy is to promote a plan that will make Croatia resilient to climate changes. The long-term goal is to reduce the vulnerabilities of natural systems and society to the negative impacts of climate change, that is, to increase resilience and the ability to recover from those impacts.
2) Achieving a sustainable development based on a knowledge and competitive economy with low carbon and resource efficiency; Increasing security of energy supply, sustainability of energy supply, increasing energy availability and reducing energy dependency; Solidarity by fulfilling Croatia's obligations under international agreements, within the framework of European Union policy, as part of our historical responsibility and contributing to global goals; Reduction of air pollution.

Description of the Strategy

1) The strategy refers to describe Croatian path to prepare all important segments of the economy and society for climate changes. The document is analyzing motivation for development of strategy, goals and priorities in plans for climate adaptation. The important part of strategy are adaptation measures to climate change (with description and stakeholders), implementation plan and overall environmental impact of strategy.
2) The document provides legal framework for development of strategy and explains the current situation in Croatia. The strategy defines emission targets for periods till 2020, till 2030 and 2050. year and provides modeled values for emission. Low carbon scenarios are defined for each sector (traffic, agriculture, industry…). Strategy also considers financial segment of projects (funding source), environmental, social and impact on economy from predicted scenarios.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
CAS		X		X					X	X	
LCDS	X	X		X					X	X	

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…
- UN = United Nation Summits/Reports

4.3.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) Yes. The strategy is based on the most relevant climate projection models with projections for period 2011-2040 and 2041-2070. The model is using available data for period 1971-2000 for all key impact indicators (sea level, rainy/dry days…).
2) Yes. The strategy is based on climate scenarios and projections for each sector in the defined time frame.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes. The strategy is a result of integral approach which, starting from the analysis of the situation in selected sectors and cross-sectoral thematic areas determinants cross-sectoral impacts and vulnerabilities as well as aggregate measures, considering the possibilities of plan realization and the cross-sectoral impacts of implemented measures.
2) Yes. The documents provide climate risk analysis and climate change effect on economy, society and environment.

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) No.
2) No.

Does any scientific organization/institution participate in the Strategy? Which ones?

1) All interested parties (including scientific organization) can give inputs or comments on prepared document.
2) All interested parties (including scientific organization) can give inputs or comments on prepared document.

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) All interested parties (including scientific organization) can give inputs or comments on prepared document.
2) All interested parties (including scientific organization) can give inputs or comments on prepared document.

4.3.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
CAS	X	X						X			X				X		X	X	Energy
LCDS	X						X	X				X	X		X	X	X	X	Waste management

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
CAS			X	
LCDS	X		X	2020-2030-2050

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other

CAS	X	X	X	
LCDS	X	X	X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Soft, project and infrastructural measures.
2) All scenarios are defined with time schedule, description, investment and expecting results.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
CAS	X	X			
LCDS	X	X		X	

4.3.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Government and related ministries, scientific institutions.
2) Government and related ministries, scientific institutions.

What are their roles and responsibilities?

1) Consultations, public debates, to put in place the expected measures.
2) -

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
CAS	X		
LCDS	X		

4.3.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) Yes. United Nations Framework Convention on Climate Change (UNFCCC), Climate-ADAPT; UN Sustainable Development Goals (SDGs), Kyoto protocol, Paris Agreement on Climate Change.

2) Yes. Kyoto protocol, Paris Agreement on Climate Change, COM (2011) 112 - Roadmap for moving to a competitive low-carbon economy in 2050.

4.3.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2020-2070
2) 2020-2030 and 2050

State of the implementation

	Not started	In progress	Delayed	Completed	Other
CAS	X				
LCDS	X				

Reasons of deviations, if any

1. None
2. None

Funding

1) European Regional Development Fund (ERDF), Cohesion Fund, European Maritime and Fisheries Fund (EMFF), European Agricultural Fund for Rural Development (EAFRD), European Social Fund (ESF).

2) European Structural and Investment (ESI) funds, EU Emissions Trading System funding, emission taxes.

Allocated budget [€]

1) € 3.6 million
2) € 50 million till 2030

4.3.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
CAS	X			
LCDS	X			

How are the outcomes of the Strategy evaluated?

1) Evaluation will be done by monitoring of specific indicators.
2) They are evaluated with developed indicators.

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) Ministries and local units.
2) Agencies, ministries and local units each in charged for target results.

What are identified as the main strengths of the Strategy?

1) Measurable targets technically and financially identified and evaluated.
2) -

What are identified as the main weaknesses of the Strategy?

1) Not identified, yet.
2) During the first trading period the number of allowances, based on estimated needs, turned out to be excessive; during the second trading period the number of allowances was reduced by 6.5%, but the economic downturn depresses emissions, and thus demand, by even more: this led to a surplus of unused allowances and credits which continues to weigh on the carbon price; "carbon leakage" refers to the situation that may occur if, for reasons of costs related to climate policies, businesses transfer production to other countries which have laxer constraints on greenhouse gas emissions: this could lead to an increase in their total emissions.

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) Immediate action of all relevant stakeholders is mandatory in efforts to prepare our society to forthcoming climate change.
2) Not applicable.

4.3.9 REFERENCES

1) https://narodne-novine.nn.hr/clanci/sluzbeni/full/2020_04_46_921.html
2) https://mzoe.gov.hr/UserDocsImages/UPRAVA%20ZA%20KLIMATSKE%20AKTIVNOSTI,%20ODR%C5%BDIVI%20RAZVOJ%20I%20ZA%C5%A0TITU%20ZRAKA,%20TLA%20I%20OD%20SVJETLOSNOG%20ONE%C4%8CI%C5%A0%C4%86ENJA/Slu%C5%BEba%20za%20odr%C5%BEivi%20razvoj/nacrt_prijedloga_strategije_niskouglj_razvoja.docx

4.4 NORTHERN ADRIATIC STRATEGIES: FRIULI VENEZIA GIULIA REGION

4.4.1 GENERAL INFORMATION

Name of the Strategy

1) Burden Sharing Friuli Venezia Giulia (Burden Sharing)
2) Impacts of climate change on the regional physical territory (Climate change)
3) Geo-hydrological plan (Piano Assetto idrogeologico -PAI)
4) Regional Energy Plan (Energy Plan)
5) Rural development programme (PSR)
6) Regional plan for the improvement of the air quality (Air quality)
7) Cognitive study of climate change and some of their impact in Friuli Venezia Giulia (Cognitive study)
8) Regional plan of transport infrastructure, freight mobility and logistic (Transport infrastructure)
9) Budoia Charter
10) NOEMIX
11) Regional plan - Friuli Venezia Giulia region action plan for green purchases (Green purchases)
12) Toll for regional scale assessment of groundwater storage improvement in adaptation to climate change (TRUST)
13) Main Environmental criticalities and response actions for the territory of the Friuli Venezia Giulia Region (Environmental criticalities)

Type of Strategy

	Adaptation	Mitigation
Burden Sharing		X
Climate change	X	

PAI	X	
Energy Plan		X
PSR	X	X
Air quality	X	X
Cognitive study	X	
Transport infrastructure		X
Budoia Charter	X	
NOEMIX		X
Green purchases		X
TRUST	X	
Environmental criticalities	X	X

Type of document that refer to the Strategy

1) Ministerial Decree, Regional indication
2) Study of state of the art for FVG
3) Regional plan
4) Regional plan
5) Regional plan
6) Regional plan
7) Regional Analysis
8) Regional plan
9) Voluntary declaration
10) Regional project

11) Regional plan
12) Report of case studies
13) Regional directive

Agency that issued the Strategy

1) Ministry of Economic Development
2) Friuli Venezia Giulia Autonomous Region
3) Friuli Venezia Giulia Autonomous Region
4) Friuli Venezia Giulia Autonomous Region
5) Friuli Venezia Giulia Autonomous Region
6) ARPA-Friuli Venezia Giulia Region
7) ARPA-FVG
8) Friuli Venezia Giulia Autonomous Region
9) Alpine Alliance
10) Friuli Venezia Giulia Autonomous Region
11) Friuli Venezia Giulia Autonomous Region
12) European Commission (LIFE Plus)
13) Environmental Authority

Year of issue

1) 2012
2) 2015
3) 2016
4) 2015
5) 2015 and subsequent changes
6) 2007
7) 2018
8) 2011
9) 2017
10) 2017
11) 2018
12) 2009
13) 2013

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Friuli Venezia Giulia Region
2) Friuli Venezia Giulia Region
3) Friuli Venezia Giulia Region
4) Friuli Venezia Giulia Region
5) Friuli Venezia Giulia Region
6) Friuli Venezia Giulia Region
7) Friuli Venezia Giulia Region
8) Friuli Venezia Giulia Region
9) Alpine regions
10) Friuli Venezia Giulia Region
11) Friuli Venezia Giulia Region
12) Veneto and Friuli regions
13) Friuli Venezia Giulia Region

4.4.2 CONTEXT

General objectives of the Strategy

1) Promoting use of renewable energy and reduce energy consumption.
2) Analysis of climate change impacts with a deep knowledge about regional climate and territory (impacts on surface and underground water systems, coastal areas, geodiversity).
3) The main objective is the mitigation of hydraulic and geological hazard of FVG river basins, of regional competence (Slizza, Levante, lagoon of Marano and Grado). This plan work in the field of soil defense, with particular reference to the defense of the population and human settlements at risk.
4) Increasingly rational use of energy with a smart, sustainable and inclusive growth.
5) Two are the main objectives: contribute to the improvement of agriculture competitiveness and primary producers and contribute to the preservation and enhancement of ecosystems.
6) Strategies and scenarios for the consolidation and the protection of air quality.
7) Support for the preparation of a regional strategy for adaptation and mitigation actions to climate change.

8) Creation of synergies between services and modes of transport.
9) Creation of an instrument for putting the principles of the Alpine Convention into practice at the local level to implement a variety of public policies for sustainable development in the Alps.
10) Transition through a low carbon economy. The objectives are the reduction CO_2 emission, increasing the energy production by RES, reducing pollution, abatement of particular matter and noise generated by congestion in urban areas.
11) Transition to more sustainable production and consumption practices a supporting of sustainable growth.
12) Provide climate change hazard scenarios for the shallow groundwater of high Veneto and Friuli Plain, Northern Italy. Identify adaptation measures based on artificial aquifer recharge to mitigate the impacts of drought and water scarcity.
13) Promotion of an environment conducive to business innovation and efficient management of natural resources.

Description of the Strategy

1) Set a regional target to achieve a 17% share of renewable energy in gross final energy consumption (electrical and thermal energy, and transport) by 2020 in Italy. This strategy is connected with the 20-20-20 goal (2020 climate & energy package) imposed by European Commission. The regional breakdown concerns only the production of FER and not the cover by FER for transports since this remains a national objective.
2) Framework on the possible climate change impact on the geomorphological and geo-hydrological system in Friuli Venezia Giulia and definition of adaption strategy, with scientific basis and monitoring of the effects, for a correct regional and local planning.
3) The plan promotes maintenance operations of the soil and the flood defense for the increase of security and environmental quality of the territory, as well as to promote necessary action and measures to improve hydraulic condition, by eliminating drainage of water barriers.
4) The Regional Energy Plan identifies objective and measures for the development and the improvement of the regional energy system with reference to the global vision of reduction of GHG emissions and increase energy efficiency (2020 climate & energy package). 57 measures of transformation have been identified for FVG region.
5) Priority 1: promote knowledge transfer and innovation in agriculture and forestry and rural zone.
   Priority 2: strengthen the profitability of farms and the competitiveness of agriculture in all its form in all regions and promote innovative technology for farms and the sustainable forest management.
   Priority 3: promote the organization of the food chain, including the processing and marketing of agricultural products, animal welfare and risk management.
   Priority 4: preserve, restore and enhance ecosystems related to agriculture and forestry.

Priority 5: encourage the efficient use of resources and the transition into a low-carbon emission and climate resilient economy in the agri-food and forestry sectors.
Priority 6: working towards social inclusion, poverty reduction and economic development in rural areas.

6) The actions for the consolidation and the protection of air quality is aimed to achieve a pollution level that respect the limits imposed by actual legislation. The objectives concern mainly the ozone and particulate matter reduction.
7) National climate change impact is used as a basis for regional analysis.
8) The establishment of an efficient transport system is considered one of the fundamental elements for achieving the objective of creating a competitive market and territorial cohesion. A strategic environmental assessment (VAS) is used for guaranteeing the sustainability of the plan choice and to integrate environmental considerations to minimize the impact and to suggest the appropriate mitigation and compensation measures.
9) The alpine municipalities undertake to implement local measures to adapt to climate change, to take actions to assess potential risks and opportunities for the municipal area, to promote public debate and raise awareness of citizen residents and visitors about risks and opportunities related to climate change at the local level. Ensuring the safety of the territory in the face of the expected impacts of climate change in the Alpine area at all administrative levels and particularly the one closest to the individual living space.
10) The strategy consists in a car sharing service for public administration through the substitution of obsolete vehicles. FVG's region intends to take a crucial role in the transition through electric mobility in synergy with Regional energy plan and SECAP of the municipalities concerned.
11) A tool by which FVG Region fully responds to the recommendations coming from the European Commission.
12) Evaluating the potential consequences of climate change on surface and ground waters and related ecosystems in order to provide suitable information for the sustainable management of water resources and the definition of effective adaptation options.
13) Identification of mitigation and adaptation strategy related to main environmental criticalities.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
Burden Sharing	X	X									
Climate change	X	X		X							

PAI	X	X									
Energy Plan		X						X		X	
PSR	X	X									
Air quality	X										
Cognitive study	X										
Transport infrastructure		X								X	
Budoia Charter	X	X									
NOEMIX		X							X		
Green purchases		X								X	
TRUST	X			X							
Environmental criticalities	X	X									

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…

- UN = United Nation Summits/Reports

4.4.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) The strategy is based on the 2020 climate & energy package targets fixed by European Commission which impose a national target for total energy consumption covered by RES. The regional breakdown has been determined considering the local availability.
2) The strategy is based on the observation of different effects in the regional territory, thanks to meteorological network.
3) The strategy is based on the observed situation along the river basin of Friuli Venezia Giulia. The rivers have been studied in their most significant part.
4) The strategy provides some scenarios of the future evolution of the system, such as economic and environmental evolution of the territory.
5) It was carried out a context analysis with SWOT analysis.
6) The strategy is based on the greenhouse gas reduction targets reported on the Kyoto Protocol.
7) Report are based on study of local impacts.
8) The plan uses an environmental evaluation which contain analysis of the regional environmental context.
9) Yes.
10) It was carried out an analysis of mobility needs which considers.
11) The strategy is an environmental challenge for choosing goods and services with low environmental impact and reducing greenhouse gas emissions.
12) Based on downscaled climate projections (precipitation, temperatures and evapo-transpiration fields).
13) Yes, the climate scenarios are one of the thematic areas considered for the analysis.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) No.
2) Forecasting models are used for supporting the decision-making process.
3) The assessment is evaluated with a risk scale.
4) The socio-economic potential of the plan measures was assessed by analyzing three studies at the national level (Greenpeace, Enel Foundation, GSE) and one at the international level (IRENA).
5) Yes, resolving the risks present is among the priorities indicated in the strategy.
6) Yes, the regional climatic data and the possible influences for the analyzed risks are analyzed.
7) Yes, climate risks and vulnerability aspects of people and buildings are considered.
8) It was carried out an environmental evaluation, through an identification of possible negative effect of the plan's actions on the environment and identification of mitigation measures for these effects.
9) Yes, Alpine Municipalities undertake to implement local measures to adapt to climate change as part of planning activities for which the municipal administration is responsible, to implement actions aimed at assessing the potential risks and opportunities of climate change for the municipal area.
10) Not shown.
11) The strategy considers the scarcity of natural resources and the excessive production of waste.
12) Three reference scenarios were selected and used to run cascading regional geomorphoclimatic and geo-hydrological models. The models produced information about the potential variations of the water balance components in relation to each climate change scenario. This information is relevant for risk and impact assessment studies and is used to develop potential hazard scenarios for the case study area and to apply a regional risk assessment model for the assessment of climate change impacts on groundwater and related ecosystems.
13) Yes, resolving the risks present is among the priorities indicated in the strategy.

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) No
2) No
3) No
4) Yes
5) Yes
6) Yes
7) Yes
8) Environmental impacts have been evaluated in the surrounding States in order to assess the opportunity for activate transboundary consultation with Austria and Slovenia.
9) No

10) No
11) No
12) No
13) No.

Does any scientific organization/institution participate in the Strategy? Which ones?

1) ERSE, ENEA (Has identified the methodology for the distribution of the national goal at the regional scale and draws up and proposes standardized datasheets for the quantification of energy saving);
2) OSMER-ARPA.
3) No.
4) ARPA FVG, University of Udine.
5) ERSA, the body responsible for technical-scientific assistance, experimentation and research, training and purchasing for the transfer of innovation, dissemination, promotion of quality brands as well as quality certification in the agricultural, fishing and aquaculture; Udine University.
6) Specialists in Plant Pathology, Entomology and Forest Zoology and Trieste University.
7) Trieste and Udine University, International Centre for Theoretical Physics (ICTP), National Institute of Oceanography and Geophysics, Institute for Biological Resources and Marine Biotechnologies (CNR IRBIM).
8) No.
9) No.
10) AREA Science Park, University of Trieste Promoscience.
11) No.
12) The simulations of the future water balance were performed using the climatic projections for the 21st century provided by the Euro-Mediterranean Centre for Climate Change (CMCC) according to the IPCC climate scenario. Impacts on Soil and Coast Division (ISC).
13) ARPA FVG.

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) GSE has provided the information about electricity production by FER.
2) No.
3) No.
4) ENEA.

5) Unions; environmental associations; Regional volunteering committee.
6) APAT- ENEA, Consortium for the Friuli-Venezia Giulia Airport.
7) Friuli Venezia Giulia Breeders Association (AAFVG).
8) Regional agency for environmental protection (ARPA), regional health agency, fisheries protection body, provinces whose territory is affected by plan and the program, park authorities whose territory is affected by the plan and program; ANIASA National Association of industry and car rental.
9) Alps Alliance, Italian Delegation Alpine Convention.
10) ANIASA (Associazione Nazionale Industria dell'autonoleggio e Servizi Automobilistici), promoscience, Friuli Venezia Giulia Region.
11) Trade associations.
12) Autorità di Bacino dei fiumi dell'alto adriatico (Alto Adriatico RbA).
13) No.

4.4.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
Burden Sharing							X									X		X	
Climate change		X	X						X										
PAI									X				X	X					
Energy Plan	X						X					X				X	X		Buildings
PSR	X	X					X		X										

Air quality				X												X			
Cognitive study	X	X	X		X		X	X	X		X	X	X		X		X		Energy sector
Transport infrastructure																X			
Budoia Charter																			
NOEMIX													X			X			
Green purchases	X	X					X												waste management
TRUST	X	X			X				X									X	
Environmental criticalities		X	X					X	X		X				X	X		X	

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery

- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
Burden Sharing			X	
Climate change			X	
PAI			X	
Energy Plan		X		
PSR			X	
Air quality			X	
Cognitive study			X	
Transport infrastructure			X	
Budoia Charter				not showed

NOEMIX		X		
Green purchases		X		
TRUST		X		
Environmental criticalities			X	

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
Burden Sharing	X			
Climate change	X			
PAI	X			
Energy Plan	X			
PSR		X	X	
Air quality	X		X	
Cognitive study				Study
Transport infrastructure	X			
Budoia Charter				Information

NOEMIX	X			
Green purchases			X	
TRUST				New technology
Environmental criticalities	X	X	X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Friuli Venezia Giulia must achieve a target of RES of 12,7%. Beyond the final goals, there are intermediate targets both for use of RES (2012-7,6%, 2014-8,5%, 2016-9,6%, 2018-10,9) and for the energy reduction (2012-3.447 ktep, 2014-3.457 ktep, 2016-3.467 ktep, 2018-3.477 ktep, 2020-3.487 ktep). This objective will be achieved by an increase of RES and energy saving at the district and territorial scale, with different type of action (e.g. measure in public transport, building, reduction of urban traffic, reduction of energy consumption in public lighting, water management, incentives.).
2) Surface water system: improve management of irrigation and drinkable water network; extension of monitoring network; real time hydraulic modelling; implementation of precocious warning systems; modification of planning policy. Groundwater resources: reduction groundwater extraction. Geo-hydrological instability: defense soil protection, warning system, awareness campaigns. Coastal zone: monitoring of rising sea level and soil variation. Geodiversity: monitoring.
3) Structural and non-structural. The interventions for the mitigation of hydraulic hazard are: construction of expansion boxes; construction of a spillway in the flood channel tunnel; adjustment

of the containment capacity of the river bed. Interventions for the mitigation of geological hazards: high energy absorption rockfall barriers; cutting and cutting stumps, wire mesh in slightly reinforced adhesion; drainage, cleaning and greening; wire mesh in reinforced adhesion, reprofiling and soaking; covering with wire mesh panels.

4) Transformation of traditional energy systems to more sustainable ones, increased in energy efficiency in different sectors (building, agriculture, tourism, transport, productive structure), awareness on sustainable energy, development sustainable mobility, reduction of GHG emissions in every sector, promote co- and tri-generation, search for sustainable mechanisms for the realization of cross-border infrastructure.
5) 14 measures:
   - Knowledge transfer and information actions: strengthen the qualification and professional skills of the sector by making available to them adequate training and information tools, which foster the link between agriculture and research and strengthen the effectiveness of the regional vocational training system.
   - Consulting, replacement and assistance services for farm management: creation of services and training of advisors.
   - Quality systems of agricultural and food products: products with specifics and recognizable characteristics, such as the distinctiveness, healthiness, genuineness, sustainability and in particular the geographical origin; very important qualification elements in the product marketing phase.
   - Investments in tangible assets: implement corporate restructuring processes towards innovative and more efficient systems; structuring in a stable manner long-term cooperation processes between companies; realized an adequate infrastructural system for the development of forestry activities in particular; restore and safeguard characteristic elements of the Friuli landscape and of the biodiversity that characterizes the agroforestry system and activate interventions for their protection even with respect to climate change in progress.
   - Development of farms and businesses: favor the generational turnover, the qualifications of operators, the structural and organizational evolution of corporate, to promote the start-up activities connected with innovative services, also connected to ICT, rural tourism and related services, social services and, in general, unconventional activities, to support the forms of diversification of agriculture towards related and complementary activities (multifunctionality) that allow the farms to integrate the business income and that can involve the member of rural family as business stakeholders.
   - Basic services and renovation of villages in rural areas.
   - Investments in the development of forest areas and in improving the profitability of forests: contribute to the improvement and enhancement of the regional forest heritage, promoting sustainable forest management and the active protection of forest surfaces, both public and private, as well as the sustainable development of the forest-wood supply chain.
   - Establishment of associations and producer organizations: intervene with integrated and coordinated actions aimed to improving and stimulating the competitiveness and innovation of rural

areas and businesses in an intelligent and sustainable way, to strengthen the organization's tolls and concentration of agricultural supply, such as associations and cooperativism for countering the symmetry in negotiating power within agriculture and forestry supply chains and providing the system with adequate tools to face the challenges of global markets and competition.
- Agri-climate-environmental payments: achievement of sustainable growth, encourage the resilient to climate change of the agricultural systems and the harmonization of economic social and environmental needs.
- Biological agriculture: the measure contributes to pursuing the objective of sustainable growth, by promoting a more efficient economy from the point of view of the resources, greener and more competitive. Other objectives concern safeguard and restoring biodiversity, improved management of water and soil resources as well as landscape of Europe.
- Natura 2000 allowances and allowances related to the water framework directive: the measure contributes to pursuing environmental and adaptation and mitigation to climate change goals. Less impact of farming in areas of particular importance for the conservation of natural and semi-natural habitats of community interest, helping to halt the loss of biodiversity, also linked to the rural landscape by maintaining ecosystem services. Increasing the resilience of agricultural land.
- Compensation in favour of areas subject to natural constraints or other specific constraints (only for mountain areas): mitigate the element of weakness that characterize the regional agricultural system in disadvantaged areas by comparing the costs and incomes of companies operating in a disadvantaged area with the costs and incomes of similar companies operating in a non-disadvantaged area. The measure therefore intends to compensate the increased costs and income losses deriving from the mere fact of operating in the mountains and not in the lowlands.
- Animal welfare: may determine, in the middle-long term, positive effects on the quail-quantitative improvement of the production, including hygiene-health aspect and therefore on the profitability of the farms.
- Cooperation: increase innovation and the collaborations between the companies and the research and knowledge system. Support in local development: development of participatory local strategy by local actions groups.

6) Reduction of the emission and PM10 in transport sector: sustainable mobility development, incentives for renewal of the transport fleet, introduction of carpooling, car and bike sharing, introduction of constraints for the use of fuel for ships, ban for heavy vehicles circulation in the urban area, realization of parking extern of the urban area with transport connection system, extension of parking fees areas and increase of rates in critical areas, increase of pedestrian areas and cycle paths, extension of students pedestrian accompanying service, increase the flexibility of public transport, optimization of the bays in urban areas.
Reduction of the emission and PM10 in energy sector: introduction of limit for fuel used for heating, use of biomass and solar energy for electricity and heat production, awareness campaigns for energy efficiency replacement of appliances and illumination systems, incentives for the installation of combined generation plants (heat, electricity, Eolic), use of efficient and low emission wood plant in tertiary sector, disposal of Servola's steel plant.

Communication and plan management for the measures: technical table institution for medium-large companies, energy efficiency programme in public buildings, training courses for energy saving and alternative us of energy, carrying out conference, studies and publications for environmental protection, verification and possible modification of actions of the plan.

7) Preliminary study for a bioclimatic classification of Friuli Venezia Giulia and its possible future variation following climate change; study of geo-hydrological instability; marine ecosystem analysis, economically relevant crops, aquaculture, livestock, forest production, impacts of climate change on forests, effects of global warming on energy consumption for heating of civilian homes.
8) Pursue the rational utilization of the transport infrastructure system through the redevelopment of the existing network for the decongestion of the road system, in particular, from heavy traffic; pursue the development of a regional network of “functional and quality” motorway and road networks linked to sustainable development and therefore capable of ensuring, with respect for the environment and territory, as well an adequate level of service for traffic flow, including increasing security and reduction of accidents; promote the transfer of goods and people from road transport to rail and water ones, in compliance with the guidelines of sustainable development, intramodality and co-modality.
9) Take measures to face climate changes, by inviting the Alpine countries to visibly increase efforts to adapt to climate change and to grow-up their resilience.
10) Substitution of 530 integrated 560 new electric cars for car leasing (public institutions) and car sharing. The project provides also the installation of recharge station (660) and the production of energy by RES which will ensure 50% of electricity demand and the remainder will be covered by the purchase of certified green energy.
11) Introduction of minimum environmental criteria for the purchase of goods, services and other; strengthening and extension of the activity in strategic sector and social criteria inclusion; dissemination of green purchases in the regional context; reduction of energy consumptions, spread of good behaviors and practices.
12) The modelling represents a comprehensive tool for the integrated assessment of multiple climate change impacts on groundwater and related ecosystems and can be used to evaluate how the possible evolution of climate, hydrological and geo-hydrological parameters can evolve in future and what could be the consequence for the related ecosystems. Useful indications could come for the selection of low water-requiring crops, the implementation of international regulation for groundwater protection from nitrate pollution, and the concession of wells exploitation rights. An additional compensation measure consists in the regulation of current groundwater uses, particularly in the case of private wells for domestic use that continuously abstract from the artesian aquifer. The expected results are: 4,26 GWh/year energy saving, 0,62 M€ reduction of total annual costs and 0-ton CO2 production which corresponds a 1,4 ton of CO2 emission.
13) Improvement of energy efficiency, use of FER, low carbon energy system, biomass and waste from industrial production; improvement of the management of agricultural ecosystems; promote mitigation measures through the management of forest ecosystems oriented towards carbon sequestration; promote sustainable mobility. Improvement of the monitoring and the resilience of

agricultural and forestry ecosystems in mountain areas, improvement of evaluation, prevention and management of natural disastrous events also through planning actions; actions for adaptation in the management of natural resources and the resilience of biodiversity and physical territory.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
Burden Sharing	X	X			
Climate change				X	
PAI	X			X	
Energy Plan	X	X		X	
PSR	X			X	
Air quality	X			X	
Cognitive study					study
Transport infrastructure	X			X	
Budoia Charter			X		
NOEMIX		X		X	

Green purchases	X			X	
TRUST			X		
Environmental criticalities	X				

4.4.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) All the Italian Regions.
2) Friuli Venezia Giulia Autonomous Region, Department of Mathematics and Geosciences, Trieste University, OSMER-ARPA.
3) Civil Protection, Geological Service, Reclamation Consortia of Ledra-Tagliamento, Lower Friuli and the Isonzo Plain.
4) ENEA, Council of Local Autonomies (CAL), Strategic Environmental Assessment (SEA).
5) Citizen; Paying Body (AGEA); Bodies representing local authorities, regional park authorities and regional LAGs; Competent regional bodies on gender policies; Regional Committee on Human Rights; Regional volunteering committee; Regional council of disabled people's associations and their families; Representatives of the agricultural and forestry economic categories; Representatives of trade union organizations; Representatives of non-agricultural economic categories interested in RDP interventions; Representatives of environmental associations; Representatives of consumer associations; Research and academic representatives; Representatives of associations / institutions that carry out anti-discrimination activities.
6) Social part and citizen.
7) ARPA FVG, FVG Region and scientific groups.
8) ARPA, Regional Health Agency; Fishing Protection Agency, Provinces whose territory is affected by the plan and program; Park authorities whose territory is affected by the plan and the program.

9) Citizen, Alpine Alliance, Budoia Municipality, MATTM.
10) FVG Region, AREA, Trieste University, BIT, ANIASA, Promoscience.
11) FVG Region and Central management of the environment, energy and sustainable development.
12) A technical Board was established including the key stakeholders concerned with groundwater management and exploitation, like Authority of the Brenta, Bacchiglione, Piave, Livenza, Tagliamento and Isonzo Rivers Basins and Euro-Mediterranean Center for Climate Change (CMCC), Italy SGI Studio Galli Ingegneria S.p.A., Italy.
13) FVG Region, ARPA FVG.

What are their roles and responsibilities?

1) Achieve the percentage target for reducing greenhouse gas emissions.
2) Friuli Venezia Giulia Autonomous Region and the scientific participants made the studies in the Friuli Venezia Giulia Region, OSMER-ARPA do monitoring actions.
3) They have provided information about the rivers.
4) ENEA provided real regional energy data; the Council of Local Autonomies (CAL) adopts the strategy and the Region provides for the implementation of the Strategic Environmental Assessment (SEA).
5) Participation in the Table where it was used the EASW1 (European Awareness Scenario Workshop) who promotes the debate and the participation of the stakeholders around development process that concern them directly, considering them all experts in an equivalent manner, as members of the same community and therefore able to interpret it starting from different points of view but not for this reason of different importance.
6) Involvement in some measures to achieve the emission reduction objective.
7) They realized the study and the analysis.
8) They have to give a collaborative contribution to the introduction of elements of environmental sustainability to the planning choices identified by the Plan.
9) They have to create a pact between mayors to face the effects of climate change and find solutions to the arising risks.
10) Create the new model of fleet management.
11) They draw up the plan.
12) Stakeholders' participation proved fundamental for guaranteeing the consistency of the project activities and achieving the project goals and long-term sustainability of the project results. Agreements with stakeholders were signed for the provision of data and the implementation of flow monitoring campaigns and Managed Aquifer Recharge demonstrations.
13) Evaluation of the main environmental criticalities.

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
Burden Sharing	X		
Climate change			Study
PAI	X		
Energy Plan	X		
PSR	X		
Air quality	X		
Cognitive study			Study
Transport infrastructure	X		
Budoia Charter	X		
NOEMIX			Proposal
Green purchases	X		
TRUST	X		
Environmental criticalities	X		

4.4.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) Ministerial Decree 15-3-2012 and Energy Roadmap 2050, Covenant of Mayors.
2) It's integrated with the global strategy for adaptation to climate change.
3) The strategy is based on the approaches presented in European (Dir.2000/60CE, Dir.2007/60/CE), national (D.Lgs 152/2006) and regional law (16/2002 law).
4) 2020 climate & energy package.
5) Europe Strategy 2020.
6) Pollutant_emission_European_policies 96/62/CE, 1999/30/CE, 2000/69/CE, 2002/3/CE, 2004/107/CE, 2008/50/CE, 94/63/CE, 1999/13/CE, 2004/42/CE, 1999/32/CE, 1999/96/CE, 2000/25/CE, 2001/27/CE, 2003/17/CE, 2005/55/CE, 2005/78/CE, 2006/51/CE, 2000/76/CE, 2001/80/CE, 2002/91/CE; Discipline of the product_characteristics of fuels 2005/33/CE, 99/32/CE; Directive on integrated pollution prevention and reduction 96/61/CE; Kyoto Protocol objective.
7) National strategy for adapting to climate change (SNACC), national climate change adaptation plan (PNACC).
8) TEN-T project, general plan of transport and logistics (PGTL), logistic plan (PL), general regional urban plan (PURG), regional plan for improving air quality, regional water protection plan.
9) The Budoia Charter takes into consideration the documents and strategies adopted at European and Alpine level, in particular the Declaration on Climate Change adopted by the 9th Alpbach Alpine Conference, the Action Plan on Climate Change adopted by the X Evian Conference, the "Guidelines for Adaptation to Climate Change at the Local Level in the Alps" approved by the XIII Turin Conference and the Multiannual Work Plan adopted by the Grassau Conference.
10) Energy roadmap 2050.
11) The strategy is integrated into the European Commission and Environmental Ministry recommendation and with the National Action Plan for green purchases.
12) Adaptation to Climate Change and Water Framework Directive, European water policy directives (2000/60/EC and 2007/118/EC).
13) European strategy 2020 and national law.

4.4.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2012-2020
2) 2015 - 2100 (trends analysis)
3) 2016-2018 2019-2021 and a long term third stage
4) 2015-2020
5) 2014-2020
6) 2007-2020
7) 2006-2100
8) 2018-2020
9) 2017-2020
10) 2017-2020
11) 2018-2020
12) 2009-2011 (Analysis for the 21st century (2010-2100)
13) 2014-2020

State of the implementation

	Not started	In progress	Delayed	Completed	Other
Burden Sharing		X			
Climate change		X			
PAI		X			
Energy Plan		X			
PSR		X			
Air quality		X			
Cognitive study					study
Transport infrastructure		X			
Budoia Charter					study

NOEMIX	X				
Green purchases		X			
TRUST				X	
Environmental criticalities		X			

Reasons of deviations, if any

1) None
2) None
3) None
4) None
5) None
6) None
7) None
8) None
9) None
10) None
11) None
12) None
13) None

Funding

1) Not shown
2) Not shown
3) Not shown
4) 10,3 million Euros (regional financing)
5) UE balance and national and regional co-financing
6) Loans granted to administrations based on their respective responsibilities.
7) FVG Region

8) Not shown
9) To define
10) 900.000 € (Community funds)
11) Public funds
12) 898.380 € (EU contribution)
13) 2014-2020 Structural Planning Funds having regard to the European objectives for their use.

Allocated budget [€]

1) Not shown
2) Not shown
3) 242 million euros (cost of the work)
4) 13 million Euros
5) 296 million euros (128 million euros from UE balance, 168 million euros from national and regional co-financing).
6) Not shown
7) Not shown
8) Not shown
9) Not shown
10) 14 M €
11) Not shown
12) 1.838.380 € (total budget)
13) Not shown

4.4.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
Burden Sharing	X			
Climate change	X			
PAI			X	
Energy Plan	X			
PSR	X			
Air quality	X			
Cognitive study	X			
Transport infrastructure	X			
Budoia Charter			X	
NOEMIX			X	
Green purchases	X			
TRUST	X			
Environmental criticalities			X	

How are the outcomes of the Strategy evaluated?

1) Monitoring.
2) Monitoring.
3) Monitoring, supervision and maintenance.

4) With some indicator (Energy efficiency, reduction of CO_2 eq., percentage of energy production from RES, social-economic value).
5) With some indicators.
6) Assessment of the measures with a simulation of emission reduction and an emission projection for 2015 and 2020. For the evaluation of the air pollutants have been established limit value.
7) Long time monitoring stations.
8) Use of monitoring indicators for air, water quality, land, radiation and traffic.
9) Not shown.
10) Not shown.
11) After the first year of implementation an audit will be conducted to assess the progress and to confirm or to rectify the actions envisaged for middle and long term. Impact indicators are used.
12) The main output includes GIS-based maps representing the spatial variability of exposure, susceptibility and risk for each considered impact and scenario. Risk mapping provides a comprehensive and focused description of future climate change risks and allows to rank areas and receptors potentially harmed in the future scenarios. The final output of the model ensemble produced information about the potential variations of the water balance components due to climate change. Evaluation of objectives and measures for the artificial water-bearing filling and analysis of the costs-benefits.
13) Monitoring and evaluation of programs.

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) The regions must submit some observation if the targets should not be achieved. Ministries is a permanent organism as a reference for the control of the achievement of regional objectives and propose some actions to overcome the barriers.
2) OSMER-ARPA.
3) Regional managers.
4) ARPA (gas emissions).
5) Regional Offices.
6) ARPA, regional, provincial and local authorities, municipalities of FVG.
7) FVG Region.
8) ARPA FVG.
9) Not shown, but probably the Municipalities involved.
10) Not shown.
11) Public procurement observers.
12) The stakeholders.

13) FVG Region.

What are identified as the main strengths of the Strategy?

1) Not shown.
2) Analysis and definition of the regional and local strategy with scientific basis.
3) Not shown.
4) The measures reflect the European legislation.
5) The Strategy development is favored by many good points that characterized the FVG Region like: mainly rural territory characterized by small inhabited centers; good income level per capita; the foreign resident population is growing; high activity rate and satisfactory employment rate (15-64 years) including female employment and low unemployment rate; good participation of the population between 25-64 in courses of study or professional training; capillarity of the regional school system, satisfactory primary sector labor productivity; added value of agriculture in keeping with other sectors; increase in bio-farms; high biodiversity and number of habitats and species of Community interest; reduction of net emissions (tons of CO2 equivalent) from agriculture.
6) Advantage of traffic and tourist flows; high standard of data quality; the models provided, offer particular numerical advantages for the implementation of pollutant transformation processes; the planned biomonitoring methods are more economical than the classical instrumental analysis techniques; advantage of the technique of transplantation in the possibility of assessing over time the fallout of trace elements in built-up areas and areas of high anthropic pressure.
7) In-depth studies.
8) Not shown.
9) Not shown, but probably, the collaboration of small communities.
10) Creation of a community of people sharing the same problems.
11) It is necessary to reach a minimum score to guarantee the quality. Use of objective criteria. Direct involvement of companies.
12) TRUST demonstrated that modelling and risk assessment tools can aid sustainable planning and management of groundwater resources in compliance with the EU legislative framework. The knowledge and experience gained can be replicated to great effect for integrating climate change into the sustainable planning of groundwater resources in Italy and worldwide.
13) Consistency with European legislation and guidelines for safeguarding human health.

What are identified as the main weaknesses of the Strategy?

1) Not shown.
2) Data are not always available.
3) Not shown.
4) Not shown.
5) The Strategy is penalized by some aspects of the Region like: inefficient management of natural resources; decline of agroforestry activities and loss of the landscape; intensive agriculture with high input use; decreased soil fertility; depopulation and aging of the population of mountain and marginal areas; weak relationships between research-innovation-companies; weak diffusion of innovation in agri-food businesses.
6) Not shown.
7) Drainage difficulty or significant hydraulic risk.
8) Not shown.
9) Not shown, but probably, finding resources.
10) Not shown.
11) Not shown.
12) Limit to provide data for the case study area, which are often scarce or unavailable. Limits are also connected to the uncertainties related to climate, hydrologic and geo-hydrological simulations involved in the hazard scenarios construction are still to be overtaken.
13) While acknowledging the importance of the "landscape" issue, its analysis was not possible because there is no system for identifying critical issue or a system of indicators useful for defining a level of criticality and hierarchy between the indicators themselves.

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) Not shown
2) Not shown
3) Not shown
4) Not shown
5) Not shown
6) Not shown
7) Not shown
8) Not shown
9) The creation of a community can produce positive effects. These common problems must be shared and faced together, on a large scale, in order to explore possible local solutions. The advantage of an alliance is that it enables you to discover and present territories that started with the same problems and that have found solution for them. The constitution of an intervention areas,

which crosses the boundaries, changed the way in which local political actors interact by considering the trans-national scale a more pertinent one to solve their local problems in certain times and places.

10) It gives a positive example to citizens and businesses for the adoption of electric car, demonstrating the transition to using the electric car is possible. In this way the FVG region become a virtuous example at national and European level.
11) The offers are evaluated with the consideration of environmental, energetic and social performance and not only with the most economically advantageous tender.
12) Not shown
13) Not shown

4.4.9 REFERENCES

1) http://www.energia.provincia.tn.it/binary/pat_agenzia_energia/normativa/D.M._15_3_2012.1334145125.pdf
2) https://www.regione.fvg.it/rafvg/export/sites/default/RAFVG/ambiente-territorio/tutela-ambiente-gestione-risorse-naturali/FOGLIA206/FOGLIA23/allegati/Impatti_dei_cambiamenti_climatici_sul_territorio_fisico_regionale.pdf
3) https://www.regione.fvg.it/rafvg/export/sites/default/RAFVG/ambiente-territorio/pianificazione-gestione-territorio/FOGLIA209/allegati/PAIR_Allegato_01_relazione_illustrativa.pdf
4) https://www.regione.fvg.it/rafvg/cms/RAFVG/ambiente-territorio/energia/FOGLIA111/#id3
5) https://www.regione.fvg.it/rafvg/cms/RAFVG/economia-imprese/agricoltura-foreste/psr-programma-sviluppo-rurale/FOGLIA119/
6) http://www.regione.fvg.it/rafvg/export/sites/default/RAFVG/ambiente-territorio/allegati/DGR913ALL1.pdf
7) https://www.meteo.fvg.it/clima/clima_fvg/03_cambiamenti_climatici/01_REPORT_cambiamenti_climatici_e_impatti_per_il_FVG/impattiCCinFVG_marzo2018.pdf
8) https://www.regione.fvg.it/rafvg/cms/RAFVG/infrastrutture-lavori-pubblici/infrastrutture-logistica-trasporti/FOGLIA18/articolo.html
9) https://alpenallianz.org/it/attualita/la-carta-di-budoia-adattamento-ai-cambiamenti-climatici
10) https://www.noemix.eu/en/
11) https://www.regione.fvg.it/rafvg/cms/RAFVG/ambiente-territorio/tutela-ambiente-gestione-risorse-naturali/FOGLIA209/FOGLIA3/

12) http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3252
13) http://www.regione.fvg.it/rafvg/cms/RAFVG/ambiente-territorio/tutela-ambiente-gestione-risorse-naturali/FOGLIA209/

4.5 NORTHERN ADRIATIC STRATEGIES: PRIMORSKO-GORANSKA COUNTY

4.5.1 GENERAL INFORMATION

Name of the Strategy

1) Program for air protection, ozone layer protection, climate change mitigation and adaptation to climate changes in Primorsko-Goranska County for the period 2019—2022 (Primorsko-Goranska County)

Type of Strategy

	Adaptation	Mitigation
Primorsko-Goranska County		X

Type of document that refer to the Strategy

1) Regional program for Primorsko-Goranska County.

Agency that issued the Strategy

1) Primorsko-Goranska County

Year of issue

1) 2019

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Primorsko-Goranska County

4.5.2 CONTEXT

General objectives of the Strategy

1) The purpose of the program is to define and elaborate objectives and measures of the impact on air quality (energy, transport, industry, waste management etc.). The program defines order of implementation of measures, the deadlines for execution, holders or obliged entities to implement the measures, as well as the assessment of Implementation of the Programme and the order of execution according to identified priority measures and activities.

Description of the Strategy

1) The program consists of the following chapters: legal framework for development of the program, area of applicability, description of current air quality and emissions, report of conducted measures from previous plans (programs), goals for air and ozone layer protection and mitigation measures for climate changes.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other

Primorsko-Goranska County		X		X							

4.5.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) Yes.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes.

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) Yes.

Does any scientific organization/institution participate in the Strategy? Which ones?

1) No, any.

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) Fisheries associations and other associations dealing with fisheries and environmental issues.

4.5.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other:
Primorsko-Goranska County												X				X			Energy efficiency

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use

- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
Primorsko-Goranska County		X		

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
Primorsko-Goranska County			X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behaviour (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Preventive measures to preserve air quality; short-term measures when there is a risk of exceeding the alert threshold; measures to achieve limit values for certain pollutants in the air within the given deadline if exceeded; measures to achieve long-term targets for ground-level ozone in the air; measures to reduce and limit the emissions of pollutants causing the adverse effects of acidification, eutrophication and photochemical pollution; measures to reduce and/or limit heavy metal emissions; measures to phase out the consumption of controlled ozone depleting substances to reduce fluorinated greenhouse gas emissions; measures to reduce and/or limit greenhouse gas emissions and adapt to climate change; measures to encourage increased energy efficiency and the use of renewable energy; measures to reduce total emissions from traffic.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
Primorsko-Goranska County	X		X		

4.5.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Not specified.

What are their roles and responsibilities?

1) Not specified.

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
Primorsko-Goranska County	X		

4.5.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) Air Protection Act.

4.5.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2019-2022

State of the implementation

	Not started	In progress	Delayed	Completed	Other
Primorsko-Goranska County		X			

Reasons of deviations, if any

1) None

Funding

1) European and MSWC Marišćina co-financing.

Allocated budget [€]

1) Not available.

4.5.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
Primorsko-Goranska County	X			

How are the outcomes of the Strategy evaluated?

1) Measures are defined descriptively, with named stakeholders and implementation priority.

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) Responsible for each area covered.

What are identified as the main strengths of the Strategy?

1) Grouping of measures for air protection, the ozone layer and climate change mitigation and adoption, among other things, of the environmental principles based on respect for generally accepted principles of environmental protection, respect for the principles of international environmental law and respect for scientific knowledge.

What are identified as the main weaknesses of the Strategy?

1) The main weakness of the program is that does not provide funding sources.

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) Grouping of measures for air protection, the ozone layer and climate change mitigation and adoption, among other things, of the environmental principles based on respect for generally accepted principles of environmental protection, respect for the principles of international environmental law and respect for scientific knowledge.

4.5.9 REFERENCES

1) https://www2.pgz.hr/doc/dokumenti/savjetovanje-s-javnoscu/2019/zrak/Nacrt%20programa.pdf

4.6 CENTRAL ADRIATIC STRATEGIES: MARCHE REGION

4.6.1 GENERAL INFORMATION

Name of the Strategy

1) Integrated management plan of coastal zone (GIZC Plan)
2) Regional Environmental Energy Plan (PEAR 2020)
3) Regional Environmental Action Strategy for Sustainability 2006-2010 (Sustainability)
4) Regional Waste Management Plan (PRGR)
5) Rural Development Program 2014-2020 (Rural 2014-2020)
6) Extraordinary plan for the development, promotion and enhancement of Marche for the 10TH legislative (Development)
7) Regional Forest Plan (PFR)
8) Regional Plan of forecasting, prevention and active fight against forest fires -2017 2019 (Forest fires -2017 2019)
9) Regional Forest Table (Forest Table)
10) Regulator Plan for Aqueducts (Aqueducts)

Type of Strategy

	Adaptation	Mitigation
GIZC Plan	X	X
PEAR 2020		X
Sustainability	X	X
PRGR	X	X

Rural 2014-2020	X	X
Development	X	
PFR	X	X
Forest fires -2017 2019		X
Forest Table	X	X
Aqueducts		X

Type of document that refer to the Strategy

1) Regional Law
2) Regional Laws
3) D.G.R. n. 225 del 9/2/2010
4) Regional Law
5) Regional Program
6) Regional Law
7) Regional Law
8) Regional Law
9) Regional Law
10) Regional Law

Agency that issued the Strategy

1) Marche Region
2) Marche Region
3) Marche Region
4) Marche Region
5) Marche Region
6) Marche Region
7) Marche Region
8) Marche Region
9) Marche Region
10) Marche Region

Year of issue

1) 2004
2) 2012
3) 2010
4) 2006
5) 2015
6) 2017
7) 2005
8) 2017
9) 2005
10) 2014

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Coastal zone of Marche Region
2) Marche Region
3) Marche region
4) Marche Region
5) Marche region
6) Marche region
7) Marche region
8) Marche region
9) Marche region

10) Marche region

4.6.2 CONTEXT

General objectives of the Strategy

1) Facilitating sustainable development of coastal areas through planning activity, in order to reconcile economic, social and cultural development, because of the changes induced by the variation of the sea level, by the extreme events, by the anthropic impacts, in order to maintain unchanged, the functions of the coastal system for a longer period.
2) Definition of the ways in which the Marche Region intends to meet its obligations mandatory provisions of the Ministerial Decree 15 March 2012 in terms of adjusting the percentage of renewable energy in gross final consumption; and revision of the Regional Energy Strategy to 2020, following the changed socio-economic context.
3) Contrast to climate change and new strategy for sustainable development.
4) Regulation of waste management activities.
5) To promote sustainable rural development in the European Union (EU) and the development of the agricultural sector to achieve greater territorial and environmental balance, which also means more competitiveness and innovation.
6) To retrieve the regional areas strongly hit by the earthquake of 2016 through a series of linked and integrated destination marketing activities synergistically declined for all regional tourist clusters and diversified on the various markets and on various reference targets.
7) Conservation of biodiversity and protection and dissemination of agroforestry systems of high natural value and protection of the territory. The principal targets are: protection and conservation of rare, exclusive and disappearing floristic species; maintaining the current vegetation structure in the mountains and high hills; safeguarding the aesthetic and historical characteristics of those plant elements that characterize the regional environment; restoration, consolidation and development of the botanical and vegetation heritage for ecological and soil protection purposes.
8) Forecasting and prevention activities and Activities of repression of the infringements.
9) To implement active sustainable management of forests and the forestry sector, to guarantee natural renewal and the protection of forest ecosystems, socio-economic development of the same sector, to give continuity and job certainty in the sector.
10) To identify the sources of supply to be "reserved" for drinking water with projection to the year 2050, as a strategic resource of the region to be protected and preserved, to guarantee the community and the future generations the availability of the primary public good.

Description of the Strategy

1) Maintenance interventions (existing rigid works, previous beach nourishment, restoration of the sandy shores) and structural interventions (new works).
2) In order to pursue the objectives of "burden sharing", the regional energy strategy for 2020 is outlined: energy savings and energy efficiency, electricity production, development and efficiency of network energy infrastructures. A Road Map is presented to 2030 with the aim of establishing a series of indications for the regional energy policy.
3) The new sustainable development strategy will address sustainability in line with the challenges posed by the global 2030 Agenda, addressing the economic, social, and environmental dimensions.
4) The strategy is structured as follows: 1. Analysis and evaluation of the operational state of affairs (for urban waste and special waste), identification of system criticalities and definition of planning objectives; 2. Definition of forecasting models, identification of strategic lines and proposals methodologies for achieving plan objectives; 3. Drafting of the Regional Plan proposal.
5) The strategy is structured as follows: 1. Innovation in the agricultural and forestry sector; 2. Enhancing the competitiveness of agriculture; 3. Organization of the agri-food supply chain and risk management; 4. Ecosystem restoration; 5. Efficient use of resources and the economy with low emissions and climate resilience; 6. Social inclusion and poverty reduction.
6) Tourism promotion. The Marche Region will directly promote its territory as a tourist destination by defining a new claim, investing also with the support of a qualified international communication and marketing agency, in advertising campaigns to be carried out on television, radio and cinema, mass media in general, printed media.
7) The strategy must include the adoption of a planning and programmatic tool for the forest sector, with significant public, socio-economic and landscape-environmental value.
8) Forecasting and prevention activities: updating of water supply points and constant updating of significant territorial skills. Prevention activities: planning and organization of reconnaissance actions, surveillance, sighting of doors of the Forest Carabinieri Stations already for the companion 2017, on a day and night basis, in relation to the areas or greater risk and according to the available resources. Activities of repression of the offenses: organization of the investigative activity of the Carabinieri Forestry Stations, of the Investigative Units of Forest and Environmental Police and of the relative specialized personnel already for the companion 2017.
9) The strategy is structured as follow: identify and incentivize rational and modern actions that include forest interventions, also supported by public resources, for the activation and implementation of a SUSTAINABLE ACTIVE MANAGEMENT, of forests by owners, entrepreneurs and managers of forest resources, public, private or public-private, giving preference to those who join together to manage significant forest extensions unitarily; perform forest management functional to the reduction of greenhouse gases; developing knowledge tools, such as inventories and detailed

forest plans, to implement the conscious management of the values and multi-functionality of the forest resource; implement plans and interventions in accordance with and in accordance with the protocols, resolutions, conferences, indications, directives, rules, regulations and regional and supra-regional guidelines for the sector; implement plans and interventions aimed at safeguarding and enhancing the landscape which set of natural and cultural values and signs deriving from anthropic interventions and the maintenance and increase of biodiversity; make the values of the forest resource shared, including the component landscaping; to foresee the maximum level of development of the multi-functionality and the public relevance of the role of the forests, including therefore the protection of the soil, water and landscape, the activation of the wood-energy supply chain, of the other products, even non-wood, obtainable from forests and afforestation, tourism, public enjoyment, environmental education.

10) The strategy is structured as follows: balance sheet of the resource in an overall and unitary management perspective Territorial Areas; containment of total losses within a maximum value of 20%; rationalization of uses and water saving; interconnection of the networks in order to balance the procurement of the entire Area and/or with the neighbouring ones; search for new water resources to replace those of poor quality and to reduce water deficits; abandon unstable sources in favour of safe concentrations from the point of qualitative-quantitative view.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
GIZC Plan	X	X								X	Updating Integrated management Plan for coastal areas (PGIAC)
PEAR 2020		X	X							X	
Sustainability	X	X		X					X	X	
PRGR		X	X							X	
Rural 2014-2020	X	X					X				

Development	X		X	X			X	X			
PFR	X	X							X	X	
Forest fires - 2017 2019	X	X	X	X						X	
Forest Table	X	X	X				X			X	
Aqueducts	X	X	X							X	

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…
- UN = United Nation Summits/Reports

4.6.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) Yes, it is. Climate scenarios and projections were studied in the PGIAC and updated in the GIZC Plan. Moreover, detection methodology provides for the use of updated measurement and detection tools
2) yes, it is. The strategy is based on the burden sharing: greenhouse gas emission reduction, use of renewable sources, energy consumption reduction.
3) Yes, it is. The target of the Strategy is to contrast the climate changes.
4) Yes, it is. Reduce climate-changing gas emissions is one of the strategy focus.
5) Yes, it is. Innovation, environment and climatic changes are the transversal targets.
6) Yes, it is. The strategy is based on the earthquake of 2016, that was an exceptional event for the amount of damage it has caused.
7) Yes, it is. The typical climate of the Adriatic regions and climate changes influence the characteristic fauna of the Marche region.
8) Yes, it is because climate conditions can influence the fire dynamics. Furthermore, to extinguish fires, the possibility of water supply must be considered, like the prevalent wind direction. The climatic conditions in the different seasons are different and can influence whether or not the fires.
9) Yes, it is. The Marche region has been split out in climatic areas, which identify areas with a certain type of climate and with specific plant species.
10) Yes, it is. In defining the scenarios, the physical and climatic features of the territory on which the drinking water is used like the IPCC Climate Change Assessment Report (Intergovernmental Panel On Climate Change), fifth assessment evaluation report Climate Change 2013, Stockholm, 23-26 September 2013.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes, man-made structures, coastal erosion, extreme phenomena and marine floods are influenced by climate changes.
2) Yes, it refers to the 20.20.20 Strategy climate change risks.
3) Increase resilience by managing calamitous events with timescales and modalities in advance programmed.
4) Aquifer vulnerability and Water risk; environmental vulnerability; landscaping vulnerability; cultural vulnerability; Area Recovery Plan with high risk of environmental crisis in Ancona, Falconara and lower Valle dell'Esino (AERCA).
5) Risk in the agricultural sector, vulnerability of the ecosystem, poor people.
6) Yes, there are. People and buildings vulnerability; and the climate changing.
7) Wood vulnerability, forest fire risks and geo-hydrological risk.
8) Woods vulnerability and forest fire risk.

9) Yes, there are. Plant vulnerability and extreme climatic events.
10) Vulnerability of inland areas, areas vulnerable to nitrates of agricultural origin in areas vulnerable to nitrates of agricultural origin, vulnerability of available waters. Risk of unavailability of water resources.

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) Yes, it planned interventions and provisions to reduced vulnerability and resilience of the coastal strip, influence beyond the borders of the regional coastal municipalities, involving the territories that face along the main riverbanks of the Marche and the neighbouring coastal regions (Abruzzo, Emilia Romagna).
2) No. The Strategy involves the Marche Region, but the problem of gas emission and renewables use involves all the world.
3) Yes. Strategy analyzes also transboundary risks crossing the Municipality of Marche region and the neighbouring region.
4) Yes, the Community legislation on waste management consider among other things the transboundary flux of the Strategy action.
5) Yes, because it refers to the National Strategic Plan.
6) Yes. The strategy take risk that cross neighbouring municipality of Marche region.
7) Yes, with neighbouring Regions.
8) Yes, between Regions or Municipalities.
9) Yes. The strategy takes transboundary risks with neighbouring region and between Marche Municipality.
10) Yes. Between Marche and other Regions and neighbouring Municipality.

Does any scientific organization/institution participate in the Strategy? Which ones?

1) No.
2) Yes. National agency for new technologies, energy and sustainable economic development (ENEA).
3) No.
4) Yes, by the specific technical-scientific contribution of Marche Region Environmental Protection Agency (ARPAM).

5) Two technical-scientific Commissions, one for the Vegetable Sector and one for the Animal Sector: an official of the Veterinary Service, hygiene, safety and nutritional quality of foods in the Marche region; representatives of the agricultural world designated by the OOPP; a professor at the Department of Veterinary Sciences of the University of Camerino who has entered the aforementioned races; a teacher at the Department of Food Science of the Faculty of Agriculture of Ancona.
6) Yes, the Marche big data social quake research institute participates in the activities of observation and economic, social psychological and anthropological interventions.
7) University of Marche.
8) University of Marche (Faculty of Agriculture).
9) Agency for Services in the Agri-food Sector of the Marche Region (ASSAM) and Regional Plant Health Service, Marche University (Faculty of Agriculture), Order of Agronomists and Forest Doctors and graduates and graduates in these disciplines.
10) Dept. of Earth Sciences - Quantitative geo-hydrological laboratory of the University of Rome "La Sapienza"; Marche University.

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) No.
2) No, any.
3) No.
4) Marche Region Environmental Protection Agency (ARPAM).
5) No.
6) No.
7) Agency Services to the Agri-food Sector of the Marche (ASSAM).
8) No.
9) No.
10) National Association of Italian Municipalities (ANCI) - Marche.

4.6.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other:
GIZC Plan		X	X						X				X		X	X	X		
PEAR 2020							X			X	X	X	X	X			X		
Sustainability									X		X		X	X		X	X	X	
PRGR	X	X									X		X	X					waste management
Rural 2014-2020	X	X			X						X		X	X					
Development				X		X									X		X		
PFR		X	X					X					X	X			X		
Forest fires - 2017 2019	X	X	X		X								X	X	X		X	X	
Forest Table	X	X											X	X					
Aqueducts		X									X							X	

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications

- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
GIZC Plan		X		
PEAR 2020			X	from 2005 to 2020
Sustainability			X	
PRGR			X	
Rural 2014-2020			X	
Development			X	
PFR			X	the strategy is valid until a new one

Forest fires -2017 2019		X		
Forest Table			X	from 2005 until a new law
Aqueducts			X	

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
GIZC Plan	X		X	
PEAR 2020		X		
Sustainability		X		
PRGR		X	X	
Rural 2014-2020		X		
Development			X	
PFR		X		
Forest fires -2017 2019			X	
Forest Table		X		
Aqueducts		X		

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behaviour (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Maintenance of existing works like previous maintenance nourishment, waste and stranded materials management; and structural interventions like new nourishment, defence and sustainable development works.
2) Energy saving: awareness and information campaigns; incentive programs characterized by bureaucratic simplicity. Use of renewable energies: with particular reference to wind energy and biomass of agro-forestry origin also for the production of biofuels. solar energy will be exploited in construction. Energy eco-efficiency: strong and widespread action of technological and managerial innovation, production of distributed electricity and thermal energy in large catchment areas located in numerous Marche valleys and along the coastal strip.
3) Local public transport (TPL); Cycle Network; Hydraulic risk mitigation; Renewable energy and energy savings (PEAR 2020).
4) Reduction of quantities, volumes and dangerousness of waste. Improvement of the technical/environmental performance of existing plants.
5) Translation of knowledge and information actions; consultancy, replacement and assistance services for farm management; quality schemes for agricultural and food products; investments in tangible assets; restoration of agricultural production potential damaged by natural disasters and catastrophic events and introduction of adequate prevention measures; development of farms and businesses; basic services and renovation of villages in rural areas; development of forest areas and improvement of forest profitability; establishment of associations and producer organizations; agri-climate-environmental payments; conversion and maintenance of organic farming practices; compensation for Natura 2000 and water constraints; compensation for areas subject to natural and specific constraints; animal welfare; forest-climate-environmental services and forest conservation; cooperation; support for local Leader development (participatory local development).
6) Cultural aggregation and networking of seven characteristic clusters: the supply and skills of the tourism industry; the offer and the competences of the typical handicraft and of the micro enterprises of the characteristic productions; the offer and the skills of the excellences of the three macro-economic sectors of the export Marche: agri-food, footwear and leather goods, household appliances and electrical appliances; the offer and skills of ICT companies and more specifically of

the so-called new digital companies directly integrated with online projects and systems; the offer and competences of cultural and creative enterprises directly and indirectly related to these clusters; the offer and skills of innovative start-ups and the sharing economy; the offer and the skills of high education and research of the four universities of the Marche region.

7) Training and information in forestry training and information operators, acquisition of skills; use of consulting services; increasing the economic value of forests, improving forestry infrastructure; increasing the added value of forest products; afforestation of agricultural land; planting agroforestry systems on agricultural land; Natura 2000 Compensation; forest environmental payments; reconstitution of forest potential and preventive interventions; support for non-productive forestry investments.
8) The prevention activity consists in implementing targeted actions or reducing the causes and potential ignition of fire as well as interventions aimed at mitigating the consequent damages. To this end all the systems and means of control and supervision of the risk areas are used, as well as the cultivation interventions suitable for improving the layout of the forest stands. Sustainable management of forest resources can play a key role in the transition to an economy or low carbon emissions, in the carbon sequestration process and in the provision of environmental public goods. economic and social needs increasingly required by society, including the possibility of tourist-recreational use.
9) Forestry cleaning and forest maintenance operations; silvicultural operations for fire-fighting purposes divided by individual categories; regional forests; regional forestry interventions with forest fire prevention purposes.
10) Water network pressure regulation; adjustment of storage tanks; water network interconnection.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
GIZC Plan	X	X			
PEAR 2020	X			X	
Sustainability		X	X	X	
PRGR	X	X			

Rural 2014-2020	X	X			
Development		X	X	X	Production sector
PFR	X	X			
Forest fires - 2017 2019	X	X			
Forest Table	X				
Aqueducts	X				

4.6.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Marche Region, Marche coastal municipalities, University of Ancona - Hydraulic Institute, Marche Environmental Protection Agency (ARPAM), National Research Council (CNR), Urbino and Camerino University.
2) Marche Region, Municipality, Mountain Communities, "Sviluppo Marche Srl" (SVIM), National agency for new technologies, energy and sustainable economic development (ENEA).
3) Marche Region, Municipality, Local Authorities, Trade Associations, Civil society.
4) Marche Region, resident population, all the waste dumps, Ecological stations, National ecological packaging (CONAI).
5) Marche Region, Farms, villages in rural areas, forest-climate-environmental services, agricultural enterprises, municipalities.

6) Citizens, businesses, associations and media in the Marche; the Administration and the Regional Council of the Marche together with the heads of Municipalities and local authorities; the national and European Authorities involved in the strategy and in the Plan, from the Extraordinary Government Commissioner to the General Directions of the Ministries of the Italian Government and the European Commission to the national and international media.
7) Marche Region, Mountain Communities, Provinces, the Park Authorities and the Municipalities, the Agency Services to the Agri-food Sector of the Marche (ASSAM), the State Forestry Corps, the University of Marche.
8) Marche Region, Marche Regional Fire Department, Carabinieri Forest Regional Command Marche, University of Marche.
9) Provinces and Mountain Communities; Municipalities, bodies managing protected natural areas; Regional services that interact directly or indirectly with the subject and the forest sector; ASSAM and Regional Plant Health Service; State Forestry Corps; Marche Polytechnic University, in particular the Faculty of Agriculture; Order of Agronomists and Forest Doctors and graduates and graduates in these disciplines; cooperative enterprises of work and services, Consortia and forest companies present and operating in the Marche and registered in the regional register of agricultural-forestry enterprises; mountain organizations pursuant to art. 18 of the L.R. n. 6/2005 (civic uses, community and agricultural universities); forest companies and other agricultural and forest entrepreneurs from the Marche, professional or not, managers or owners of significant forest complexes.
10) Qualified personnel of Marche Region.

What are their roles and responsibilities?

1) Marche Region: drawing up of preliminary guidelines to the drafting of the ICZM Plan. University of Ancona: studies, mathematical model investigations aimed at drafting the Coastal Defence Plan and general cartography. ARPAM: final report on bathing and biocenosis and on sediment quality. CNR, University of Camerino, Urbino, Ancona: granulometric analysis, with the comparison between the 1999-2015 sedimentological campaigns; sediment quality; bathing; biocenosi.
2) Marche Region updated the Energy Plan, has studied the energy situation in the Marche region; the Municipalities had to adopt the Local Energy Plan; Sviluppo Marche Srl coordinated a European project financed under the IIE (Intelligent Energy for Europe; ENEA analysed the energy balance
3) Local Public Transport: Marche Region and Ministry of Infrastructure and Transport-->economic funds. Cycle network: Marche Region and National System of Tourist Cycleways-->economic funds. Hydraulic risk mitigation: Marche Region and volunteers-->proper management of water resources, enhancement of river territories, safeguard from hydraulic risk.
4) Marche Region makes a plan for waste management in the region of Marche; resident population have to know the recycling rules; all the waste dumps must recycle waste preserving the

environment optimizing reuse; Ecological stations or Collection centres for separate waste collection of urban waste; National ecological packaging (Conai) stations: the collection centres for separate collection of urban waste.

5) Marche Region stipulates the Program, the other stakeholders have to follow the Program and adapt their facilities.
6) For each of these "channels" of relationships and data flow, policies, content, marketing and communication tools will be developed together with specific feedback monitoring methods.
7) The Marche Region regulates the plan and together with the Mountain Communities, the Provinces, the Park Authorities and Municipalities finances the actions to be taken. The ASSAM issues the opinion of the Regional Plant Health Service. The State Forestry Corps monitors safety in the forest area. The University of Marche processes scientific study data.
8) Marche Region, Marche Regional Fire Department, Carabinieri Forest Regional Command Marche arrange the strategy planning. Marche Region carries out prevention actions with the Carabinieri Forest Regional Command Marche. University of Marche helped in the study of the territory, environment and climate.
9) Every stakeholder should make possible the strategy and the plan objectives. The Marche Region drawing up the Forest Plan; the University studies the territory, the climate and the characteristics of the forest; the ASSAM and Regional Plant Health Service control the plant species; the State Forest Corps makes monitoring actions; the Administrations involved in the strategy applies it in their territories.
10) They have to study the territory, the water availability and drawing up the plan

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
GIZC Plan	X		
PEAR 2020	X		
Sustainability	X		
PRGR	X		
Rural 2014-2020	X		

Development	X		
PFR	X		
Forest fires -2017 2019	X		
Forest Table	X		
Aqueducts	X		

4.6.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) The Strategy is integrated into an existing policy: Administrative Resolution of the Regional Council (DACR) n. 169 of 02/02/2005 and the Regional Law 15/2004, that refers to the Integrated Management Plan for Coastal Areas (PGIAC) and its updating Basin plan for the geo-hydrological structure of the regional basins (PAI)"", Regional Laws 31/2012, 48/2013 and DACR 100/2014, 2007/60/CE Directive, Legislative Decree 49/10, Legislative Decree 152/06, Law 221/2015).
2) The Strategy is integrated into the document of "World Energy Group" drafted by the International Energy Agency; into the European strategy "Energy Union" and into the "National Action Plan for renewable energies of Italy"(PAN).
3) D.G.R. n. 225 of 09/02/2010; Agenda 2030.
4) Yes, it is. Italian Legislative Decree of 3 April 2006, n. 152, Art. 199 and Legislative Decree of 3 December 2010, n. 205. Directive 2008/98/EC. Directive 2012/19/UE.
5) Yes, it is. The Strategy is integrated in the National Strategic Plans and in the European Strategy 2020
6) No.
7) Yes, Regional Law February 23, 2005, n.6 Article 4.
8) Law 21 November 2000, n. 353, art. 3.
9) Regional Law 23 February 2005, N. 6, Art. 4.
10) Decree of the Regional Council n. 238 of 10 March 2014.

4.6.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2005 - 2019 and beyond
2) 2012-2020
3) 2010-2030
4) 2006-2020
5) 2014-2020
6) 2015-2020
7) 2005-until a new law
8) 2017-2019
9) 2005 until a new law
10) 2014-2050

State of the implementation

	Not started	In progress	Delayed	Completed	Other
GIZC Plan		X			
PEAR 2020		X			
Sustainability		X			
PRGR		X			
Rural 2014-2020		X			
Development		X			

PFR		X			
Forest fires -2017 2019		X			
Forest Table		X			
Aqueducts		X			

Reasons of deviations, if any

1) None
2) None
3) None
4) None
5) None
6) None
7) None
8) None
9) None
10) None

Funding

1) Marche Region; European Regional Development Fund (POR - FESR 2014-2020); Development Fund and cohesion (FSC); Safe Founds Italy (State); LIFE Project; UE POR - FESR 2021-2027; Municipalities and private individuals.
2) Marche Region.
3) Local Public Transport: POR – FESR MARCHE, FSC 2014-2020 funds, Ministry of Infrastructure Funds. Bicycle lane: National System of Tourist Cycleways. Hydraulic risk mitigation: Law 191/2009, Design Fund DPCM 14/7/2016, POR-FESR 2014-2020 Axis V 11,4 POR-FESR 2014-2020 Axis VIII, Development and cohesion funds.
4) Marche Regions and the Municipalities.
5) UE and national co-financing.

6) Earthquake loan, European funds, state funds, regional funds, donations.
7) Marche Region.
8) Civil Protection Service.
9) Marche Region.
10) Public funds but they are not enough.

Allocated budget [€]

1) Region Marche has allocated € 1.8 million/year for the maintenance of the defense works of the coast and € 2.2 million/year for new projects. European Regional Development Fund (POR - FESR 2014-2020): allocates € 11.4 million in agreement with the Italian railway network - RFI (2014-2020). Development Fund and cohesion (FSC): € 8 million for the completion of coastal defense works in the erosion area in the Municipalities of Montemarciano and Falconara North (2014-2020). Safe Founds Italy (State): € 10,2 million for coastal erosion. LIFE Project: € 3,4 billion for the integrated management of coastal areas. UE POR - FESR 2021-2027: 44,9 million for the programmed works. Sharing on the total of work by 12% by part of Municipalities and 4% by private individuals.
2) Marche Region POR-FESR 2007-2013 funds: € 32.763.381,83.
3) Local Public Transport: € 44,54 million. Bicycle lane: € 44,3 million. Hydraulic risk mitigation: € 49,4 million.
4) Total per capita cost of urban waste management in relation to the collection percentage differentiated in the year 2011: 224 euros/t. Breakdown between service costs and recovery and disposal costs in 2011: 77 euros/inhabitant.
5) 537,96 million euros.
6) € 2,000,000.00 will be covered by the loan as per article 22 of the legislative decree 17.10.2016, n. 189 "Urgent interventions in favour of the populations affected by the 2016 earthquakes"; € 33.450.000,00 community funds, state funds, regional funds, donations. The next objective will be to design, with European funds, investments aimed at web marketing and social media marketing and to share the digital strategy with the territorial subjects in such a way that the whole “Regional Tourism System” can be involved in an even more integrated way.
7) 7 million of € every year by the Marche Region.
8) € 2 million Civil Protection Service.
9) CFS Convention € 15,785.00; Delegations for forestry € 780,000.00; Public intervention n. 18 Fight against forest fires € 627.971,00; Management of regional forest nurseries € 209,100.00; public intervention n. 19 Maintenance and storage tree heritage € 55,000.00; Census and list of formations monumental vegetables € 70,000.00; Studies and research in the forestry field: Camaldolese forest codes € 50,000.00. Fact-finding surveys, monitoring, research on propagation material forestry €

29,606.37; Forestry nursery infrastructure supply regional € 210,000.00; public intervention n. 19 Costs for the financing of pilot forest eco-certification projects € 23,100.00.

10) € 150 million for the 2014-2020.

4.6.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
GIZC Plan				The strategy is still in the implementation phase
PEAR 2020	X			
Sustainability		X		
PRGR	X			
Rural 2014-2020	X			
Development	X			
PFR	X			
Forest fires -2017 2019	X			
Forest Table	X			
Aqueducts	X			

How are the outcomes of the Strategy evaluated?

1) After the end of work, a monitoring phase will be conducted for over 2 years, to assess the progress and to confirm or to rectify the actions of the strategy for middle and long term.
2) Monitoring the analytical projection on energy consumption until will be reach the 20% reduction in consumption calculated with the Business As Usual (BAU) scenario.
3) Monitoring.
4) Monitoring and controlling.
5) Monitoring and rating.
6) Monitoring and rating.
7) Monitoring.
8) Monitoring.
9) Monitoring.
10) Monitoring.

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) Marche Region and Marche Polytechnic University-->Biodiversity monitoring; ISTAT, AATO, Competent District Authority, ARPAM-->water; ISPRA, Marche Region-->soil; Marche Region, Marche Superintendence of Archeology Fine Arts and Landscape-->cultural heritage; Marche Region-->climate changes; ARPAM-->human health.
2) Italian Renewable Sources Monitoring System (SIMERI) managed by GSE and ENEA.
3) "Cabina di Regia".
4) Marche Region have to monitor and review the actions every year.
5) Marche Region and all the stakeholders.
6) Marche Region and the stakeholders of the strategy.
7) The State Forestry Corps, the University of Marche.
8) Marche Region and Forest carabinieri service.
9) State Forest Corps.
10) Marche Region.

What are identified as the main strengths of the Strategy?

1) High quality technology in the analysis phase.
2) Stubborn reserves of primary energy from natural gas guarantee more than production a decade at current pumping rates. The National Energy Strategy judges the storage capacity currently under construction and authorized sufficient for the purpose's security of supply, without prejudice to further initiatives for commercial purposes.
3) The Marche Region contributes to the achievement of objectives (GOALs) of the 2030 Agenda through the implementation of sectoral policies.
4) Maximization of material recovery and minimization of the quantity and danger of the waste to be disposed of and the elimination of landfill disposal of undifferentiated waste.
5) The creation of a rural national network.
6) Strong appeal of Made in Italy on international markets; consistent international demand on integrated tourism, culture, territory.
7) Preservation of the "foret mediterraneenne", that is the richness of flora and therefore of fauna.
8) Sustainable action on the territory.
9) Every function is expected to be able to actively contribute, if rationally developed and bound by goals of healthy entrepreneurship and economy, founded on solid bioecological-silvicultural and ethical bases, to a harmonious development, and also to the protection of the entire sector and the regional territory as a whole.
10) Specific planning.

What are identified as the main weaknesses of the Strategy?

1) Integrated strategy of sustainable development and environmental quality promotion. Guarantee the sustainable use of natural resources, and in particular of water resources.
2) The lack of qualified job opportunities and the lack of energy infrastructure capable of supporting the development of sustainable and innovative companies, are two aspects that do not help to put a brake on the abandonment of the territory by the new generations, which are increasingly attracted to green and hi-tech jobs. The lack of local bodies of technicians specialized in the planning of interventions, in following the practices of recognition of incentives, etc.
3) Time of updating and founding resources.
4) The amount of waste authorized annually for the type of recovery R2 - solvent regeneration/recovery is marginal.
5) Problems of applicative cooperation between the National Agricultural Information System (SIAN) and the Agriculture Information System (SIAR), especially in the area agri-environmental agreements. Abandonment of the woods by mountain communities. Problems in the company profitability.
6) Economic and social context in difficulty due to the ongoing structural crisis.
7) Management of disadvantaged areas such as mountain and marginal areas.

8) To cover a vast territory.
9) To avoid protectionist and economic excesses.
10) Funds research.

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) The "calibration" of the work based on previous experience and on the sensitivity of the area can be mitigated through careful planning. It is essential that it is develop of an effective monitoring system, that allows to detect "in real time" unexpected impacts and, therefore, to "correct the shot" before such impacts become significant and/or irreversible.
2) The photovoltaic market will continue to grow. Electrical biomass will become increasingly important. Wind energy is the electrical renewable resource that cannot be dispensed with in any way. There is still a very close link between energy consumption and production trends industrial.
3) Not shown.
4) The waste management is a long process of waste dumps adaptation and transformation.
5) Cooperation is the most important thing.
6) Cooperation is on the base of the strategy.
7) The distribution of vegetation is influenced by phytoclimatic strips and an active and sustainable management must be planned and coordinated.
8) Cooperation is important.
9) Cooperation between policy, non-policy and scientific stakeholders is important.
10) Not shown.

4.6.9 REFERENCES

1) http://www.regione.marche.it/Regione-Utile/Paesaggio-Territorio-Urbanistica-Genio-Civile/Difesa-della-costa#Piano-GIZC-2019
2) https://www.regione.marche.it/Regione-Utile/Energia/Piano-Energetico-Ambientale-Regionale
3) https://www.assemblea.marche.it/marcheuropa/edizione_2018/fermo/presentazione_goffi.pdf
4) http://www.regione.marche.it/Regione-Utile/Ambiente/Rifiuti-e-inquinamento/Rifiuti#Pianificazione
5) https://www.regione.marche.it/Entra-in-Regione/Psr-Marche/Psr-2014-2020/Cos%C3%A8-il-PSR

6) https://www.consiglio.marche.it/banche_dati_e_documentazione/iter_degli_atti/paa/pdf/d_am41_10.pdf
7) https://www.consiglio.marche.it/banche_dati_e_documentazione/iter_degli_atti/paa/pdf/d_am106_8.pdf
8) http://www.regione.marche.it/Portals/0/Agricoltura/Foreste/Normativa_Regionale/DGR%20792_2017%20Piano%20Antincendi%20Boschivi.pdf
9) https://www.consiglio.marche.it/banche_dati_e_documentazione/iter_degli_atti/paa/pdf/d_am106_8.pdf
10) http://www.norme.marche.it/Delibere/2014/DGR0238_14.pdf

4.7 CENTRAL ADRIATIC STRATEGIES: ŠIBENSKO-KNINSKA COUNTY

4.7.1 GENERAL INFORMATION

Name of the Strategy

1) Integrated Coastal Zone Management Plan of the Šibenik-Kninska County (Šibensko-Kninska County)

Type of Strategy

	Adaptation	Mitigation
Šibensko-Kninska County	X	

Type of document that refer to the Strategy

1) Guidelines for integrated management plan for coastal zone in Šibensko-Kninska County (Coastal Plan of Sub National Regions).

Agency that issued the Strategy

1) Center for Regional Activities of the Priority Action Program, Split

Year of issue

1) 2016

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Šibensko-Kninska County

4.7.2 CONTEXT

General objectives of the Strategy

1) The purpose of the plan is to provide guidelines for integrated management of coastal zone in Šibensko-kninska county, taking in consideration facing climate changes. Promote accepting sustainability and resilience as coastal zone development criteria; create prerequisites for defining sustainability in concrete domains; contribute to the strengthening of participation and education; provide guidelines for sectoral policies and plans to achieve sustainability and resilience; make recommendations for resolving conflicting issues in achieving sustainability and resilience; offer a platform for sustainable development of the Šibenik-Knin County coastal zone based on water as its fundamental resource, blue economy and smart specialization.

Description of the Strategy

1) The document provides a description of current state in coastal areas (population, coastal morphology and water areas), identification of key problems and vulnerability of coastal area. The important part of this document is vision for future development and scenarios for fulfilment of that goal. The Coastal Plan is not a "normative" plan, it belongs to a group of "indicative" plans that provides guidance for managing certain issues and defining solutions which are incorporated into normative plans. The Plan is primarily intended for the County Administration employees in charge of the County's coastal area, institutions and administrations whose activities are connected to the

coast. The Plan is also intended for the general public, the population living in the coastal area, or those who are there because of work related activities, investments or leisure time and recreation.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
Šibensko-Kninska County	X	X		X			X			X	

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…
- UN = United Nation Summits/Reports

4.7.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) Yes. UNDP's Human Development Report for Croatia (entitled A Climate for Change): this report noted that the county had coastal areas that were highly vulnerable to climate change.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes. The strategy highlights the main vulnerabilities related to different sectors such as coastal protection, water services, agriculture and fisheries, conservation, and tourism.

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) Yes, for socio-economic analysis. Macro-transnational regions: Adriatic-Ionian, Central Europe, Danube, Mediterranean.

Does any scientific organization/institution participate in the Strategy? Which ones?

1) Education and research institutions are considered stakeholders with two interviews.

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) Civil society (NGOs).

4.7.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
Šibensko-Kninska County	X	X	X					X	X				X	X	X			X	

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
Šibensko-Kninska County			X	

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
Šibensko-Kninska County		X	X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behaviour (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) The DIVA method provides forecasts of climate impacts and costs that are used in preparing the Coastal Plan. The DIVA method builds modular integrated computer models by bringing together knowledge from natural and social disciplines. DIVA enables users to choose scenarios and adaptation strategies and to compare results for different scenarios and adaptation strategies. It is being used to assess the possible costs of climate variability and change for all of Croatia's coast. Due to the small size of Šibenik-Knin County, DIVA results for Croatian coastal zone will be downscaled for Šibenik-Knin County for the purpose of the Coastal Plan. This task will be carried out by a group of international experts taking into consideration local data concerning tourism, agriculture, healthcare, infrastructure and possible forest fire costs. Climate impacts and possible

adaptation responses were discussed with stakeholders in the county using a participatory method called Climagine, which was developed as part of the larger UNEP/GEF project.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
Šibensko-Kninska County			X	X	

4.7.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Local, regional and national institutions were active in the development of this document (Ministries, municipalities, public institutions (national water and forests management companies, NGO…): Governance and policy-making bodies – thirteen interviews; Regional and local authorities; State institutions represented in Šibenik-Knin County; Education and research institutions; Civil society (NGOs); Businesses.

What are their roles and responsibilities?

1) Some interviews are made to them to acquire local knowledge, elicit local creative ideas and create a relationship of trust on which the future implementation of the Coastal Plan relies.

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
Šibensko-Kninska County	X		
Primorsko-Goranska County	X		

4.7.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) The plan is part of the project "Integration of climatic variability and change into national strategies to implement the ICZM Protocol in the Mediterranean", and it was also prepared following the planning stages suggested by the Integrative Methodological Framework guidelines and the Guidelines for Adapting to Climate Variability and Change along Mediterranean Coast.

4.7.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2013-2015 (the plan will be applicable to the period up to 2030)

State of the implementation

	Not started	In progress	Delayed	Completed	Other
Šibensko-Kninska County		X			

Reasons of deviations, if any

1) None

Funding

1) Not shown.

Allocated budget [€]

1) Calculated on the basis of DIVA method, but not available.

4.7.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
Šibensko-Kninska County	X			

How are the outcomes of the Strategy evaluated?

1) Monitoring, modelling and forecasting.

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) Department for environmental protection and public utilities, and the spatial Planning bureau (Šibensko-kninska county) were the most interested public body for the development of this document and they were identified as the implementing body.

What are identified as the main strengths of the Strategy?

1) Stakeholder participation; establishing a link between relevant sectoral plans, spatial plans, the Development Strategy of Šibenik-Knin County, and the Coastal Plan; collection and storage of relevant information, knowledge and awareness on climate variability and change, and on the possible impacts on the coastal zone.

What are identified as the main weaknesses of the Strategy?

1) The budget and precise time schedule for implementation is not foreseen. Ambiguity concerning the legal basis for preparation of the Coastal Plan since the relevant planning legislation in Croatia does not foresee the preparation of a Coastal Plan at county level; the existing spatial and physical plans do not give special attention to the coastal zone; the issue of climate change is still very new for the stakeholders and inhabitants, so that they may not fully grasp the importance of the issue resulting in failure to take timely measures to adapt to climate change and minimize their negative impacts; difficulties in obtaining relevant information.

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) Be able to identify key issues; apply a holistic approach; territorial coverage must also be defined; integration is easy to recommend but difficult to achieve; a Coastal Plan offers a number of recommendations but also opens a number of questions.

4.7.9 REFERENCES

1) http://pap-thecoastcentre.org/pdfs/ENG%20Obalni%20plan%20SKZ%20-%20Web.pdf

4.8 SOUTHERN ADRIATIC STRATEGIES: APULIA REGION

4.8.1 GENERAL INFORMATION

Name of the Strategy

1) Adaptation to climate changes, prevention and management of risks (Axis V - Action 5.1. - Subaction 5.1.3) (POR Apulia 2014-2020)
2) Monitoring system to prevent wildfires "Operational Fire Danger Prevention Platform (OFIDIA)
3) Regional Programme of Rural Development – Apulia (Rural Development)
4) Recovery and reuse of surplus, food waste and pharmaceutical products (Waste)
5) Aid for investments of Small and Medium Enterprises in energy saving, in high-efficiency cogeneration and in the use of renewable energy sources (Enterprise)
6) Standards for sustainable living (Living)
7) Urgent measures to contain light pollution and save energy (Pollution)
8) Apulia - Regional Operational Program - POR ERDF and ESF 2014-2020

Type of Strategy

	Adaptation	Mitigation
POR Apulia 2014-2020	X	
OFIDIA	X	
Rural Development	X	
Waste		X
Enterprise		X

Living		X
Pollution		X
POR ERDF		X

Type of document that refer to the Strategy

1) EU Regulation n.1303/2013.
2) Cooperation operational program between Greece and Italy for the 2007-2013 period.
3) Directive 2001/42/EC, EU Regulations n. 1305/2013, n.1306/2013, n. 1310/2013, Regional Council Decision n. 39 of 29 January 2013.
4) European Directives 2003/94/EC and 2001/83/EC, National Law August 19, 2016 n. 166, Regional Law of May 18, 2017 n. 13
5) European Regulation (EC) n. 800/2008, Regional Regulation November 21, 2008 n. 26
6) Regional Law n.13/2008
7) Regional Regulation n.13/2006
8) POR ERDF and ESF Apulia 2014-2020 (D.G.R. Resolution of the Regional Council n. 1735 of 6 October 2015) - Referred to the 1) Decision C (2015) 5854 of 13 August 2015 of the competent services of the European Commission, (Decision notified to Regione Puglia through the Permanent Representation of Italy at the European Union on 2 September 2015), with which the Operational Regional Program 2014-2020 of Apulia was approved 2) Regulation (EU) No. 1301/2013 of the European Parliament and of The Council of 17th December 2013

Agency that issued the Strategy

1) Civil Protection Section of Apulia Region
2) Apulia Region and Greece Region (Municipality of Bari, Brindisi, Lecce, Ioannina)
3) Apulia Region
4) Apulia Region
5) Apulia Region
6) Apulia Region

7) Apulia Region
8) Apulia Region - European commission

Year of issue

1) 2014
2) 2015
3) 2014
4) 2017
5) 2008
6) 2008
7) 2006
8) 2014

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Apulia Region
2) Apulia Region, Greece
3) Apulia Region
4) Apulia Region
5) Apulia Region
6) Apulia Region
7) Apulia Region
8) Apulia Region

4.8.2 CONTEXT

General objectives of the Strategy

1) Reducing the geo-hydrological and coastal erosion risks.

2) The project contributes to protecting the environment and preserving natural resources through environmental monitoring platform and OFIDIA fire risk forecast for Apulia Region and north-western of Greece.
3) Promoting knowledge transfer and innovation in the agricultural sector e forestry and rural areas, Strengthen the profitability of farms and competitiveness agriculture in all its forms and promote innovative technologies for farms and sustainable forest management. Promoting the organization of the food chain, including the processing and marketing of agricultural products, animal welfare and risk management in the agricultural sector. Preserving, restoring and enhancing ecosystems connected to agriculture and forestry. Encouraging the efficient use of resources and the transition to a low carbon and climate resilient economy in the agri-food and forestry sectors. Working towards social inclusion, poverty reduction and economic development in rural areas.
4) Reducing the environmental impact caused by food waste and expired drugs, through the recovery and redistribution of surpluses and the reduction in the quantity of waste, in order to create a circular economy that recovers goods that are not consumed and redistributes them a solidarity perspective; contribute to information and awareness-raising activities for food and pharmaceutical sector operators and consumers; coordinate the activities of all stakeholders involved in food and pharmaceutical distribution; promote the creation and dissemination of partnership models through the promotion of collaboration agreements between food and pharmaceutical operators and donors; coordinating the control activities of the various phases of combating waste, also in collaboration with the healthcare companies, to ensure the maintenance of hygiene and safety requirements of the product; promote the transparent use of food surpluses and pharmaceutical products, also through their traceability, in compliance with the provisions of article 16 of Law 166/2016.
5) This aid scheme has for purpose the granting of environmental aid to small and medium-sized enterprises for investments aimed at improving the environment energy balance of the company.
6) Promotion of environmental sustainability and energy savings both in territorial and urban transformations and in the construction of public and private building works.
7) Reduction of light pollution and the energy consumption resulting therefrom, in order to preserve and protect the natural environment, also understood as a territory, both internal and external to protected natural areas.
8) The POR FESR-FSE Apulia for the period 2014-2020, intends to contribute to the general objective of smart, sustainable and inclusive growth, in particular intends to support the competitiveness and internationalization of businesses; green and blue economy, agri-food, sustainable construction, cultural heritage and tourism; cultural and creative industry, services, social innovation, design.

Description of the Strategy

1) The Operational Program of Puglia 2014-2020 was elaborated taking into account the provisions of the EU Regulation n. 1303/2013, which identifies 11 thematic objectives underlying the implementation of the Cohesion Policy, in turn aligned with the priorities and objectives of the Europe 2020 strategy.
2) Installation visual and thermal automated cameras throughout the wooded area; the project has also developed an ICT infrastructure that provides geographic maps online with advanced weather forecasts, fire risk indices and historical information on meteorological sensors, forecast data and forest fires.
3) A justification of the selection of the needs to which the RDP intends to respond and of the choice of the objectives, the priorities, the specific aspects and the setting of the objectives, is based on the tests of the SWOT analysis and on the assessment of needs. Where appropriate, a justification of the thematic sub-programs included in the program. The justification must show in particular compliance with the requirements referred to in Article 8, paragraph 1, letter c), points i) and iv) of EU Regulation n. 1305/2013.
4) The Apulia Region, in order to protect the weakest sections of the population and encourage the reduction of waste, recognizes, enhances and promotes the activity of solidarity and charity aimed at the recovery and redistribution of food surpluses and pharmaceutical products in favor of people in a state of poverty or severe social unease. The Apulia Region also promotes actions aimed at the recovery and redistribution of food waste to be used for human and animal consumption.
5) 1. The Apulia Region identifies sustainable development as the main factor on which to embed growth and expansion policies of the employment basis. 2. Sustainable development is based on improving energy efficiency, increasing the share of energy from renewable sources and on the promotion of energy saving. 3. Small and medium-sized enterprises play an important role in job creation and social stability and economic dynamism. 4. Small and medium-sized enterprises, however, find it difficult to implement investments aimed at protection improvement of the quality of the environment due to the possible increases in the overall costs of production.
6) It defines the tools, techniques and the constructive methods that are sustainable in the instruments of territorial governance, in the interventions of new construction, building and urban recovery and urban redevelopment.
7) This regulation implements the Regional Law of 23 November 2005, n. 15, with which Regione Puglia pursues the objectives of protecting environmental values aimed at the sustainable development of the regional community.
8) The strategy of the 2014-2020 POR ERDF of Regione Puglia aimed to ensure continuity with the actions implemented under the 2007-2013 Programming, identifying four macro-areas of intervention aligned with the Europe 2020 objectives. They are: 1) Policies for research and innovation whose objective is to develop programs and interventions in the field of industrial research and innovation with reference to the open innovation paradigms; to strengthen the regional digital system (starting from the reduction of the digital divide) and to expand the conditions

for enhancing the competitiveness of the Apulian economic and entrepreneurial fabric also with a view to internationalization. 2) Contextual policies (infrastructure and environment) aimed at improving conditions regarding energy efficiency, securing the territory, protecting and enhancing cultural and environmental resources, and promoting sustainable transport systems. This also in the direction of promoting sustainable urban development, starting from the peripheral contexts that need adequate redevelopment measures. 3) Policies for the labor market, social inclusion and welfare aimed at increasing the labor supply through incentive measures to increase employment and participation in the labor market. Added to this are specific actions aimed at reducing poverty and combating social exclusion, as well as interventions to improve school and training skills. 4) Policies to strengthen administrative capacity aimed at strengthening skills (responsibilities and organizational models), reducing bureaucratic burdens (simplification), strengthening transparency and using shared methods of intervention.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
POR Apulia 2014-2020	X									X	
OFIDIA	X			X							
Rural Development	X	X		X			X	X			
Waste		X									
Enterprise		X					X				
Living		X					X				
Pollution				X			X	X			
POR FESR		X		X			X	X		X	

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…
- UN = United Nation Summits/Reports

4.8.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) Yes, the strategy is based on the indications of the Natura 2000 Network.
2) Yes.
3) Yes.
4) No.
5) Yes.
6) Yes.
7) No.
8) Yes.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes, the hydraulic risk is analyzed.
2) Yes.
3) Yes.
4) No.
5) Yes.

6) Yes.
7) No.
8) Yes.

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) No.
2) No.
3) Don't know.
4) No.
5) No.
6) No.
7) No.
8) No.

Does any scientific organization/institution participate in the Strategy? Which ones?

1) National Research Council, National Institute of Geophysics and Volcanology
2) No
3) Universities, Agronomic Institutes, National Research Council
4) No.
5) No.
6) No.
7) No.
8) Bari University; Salento University; Foggia University; CNR-IRSA.

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) Centers of Competence, ARPA (Regional Agency for Environmental Protection) of Apulia Region, Professional Orders, Volunteering.
2) European Community.

3) GAL (Local Action Groups).
4) No.
5) -
6) European Community, Regione Puglia.
7) European Community, Regione Puglia.
8) ANCI; UPI; CIA APULIA; COLDIRETTI APULIA; CONFAGRICOLTURA APULIA; CLAAI APULIA; CNA APULIA; CONFAPI APULIA; CONFARTIGIANATO APULIA; CONFCOMMERCIO APULIA; CONFCOOPERATIVE APULIA; CONFESERCENTI APULIA; CONFINDUSTRIA APULIA; CONFEDERAZIONE PRODUTTORI AGRICOLI (COPAGIRI); LEGA COOP APULIA; UNCI APULIA; CGIL APULIA; CISL APULIA; UIL APULIA; CISAL APULIA; UGL APULIA; CASA ARTIGIANI APULIA; UNCEM; UNION CAMERE; ABI; Regional Forum of Tertiary Sector; ACLI ANNI VERDI; AGRITURIST; AMICI DELLA TERRA; ASSOCIAZIONE AMBIENTE E LAVORO; C.A.I.(Club Alpino Italiano); CODACONS; EKOCLUB INTERNATIONAL; F.A.I.; ASS. FARE VERDE ONLUS; TOURING CLUB ITALIANO; VERDI, AMBIENTE E SOCIETA'; WWF; RAPPRESENTANTI DELLA RETE DEI CSV; CENTRI SERVIZIO VOLONTARIATO PUGLIESI; FEDERSOLIDARIETA'; CONSORZIO MERIDIA DI COOP SOCIALI; LEGA DELLE COOPERATIVE; ASSOCIAZIONE TRA COOPERATIVE AXIA

4.8.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
POR Apulia 2014-2020			X						X										
OFIDIA	X			X	X	X					X								

Rural Development	X	X			X				X		X		X	X		X		X	
Waste											X								
Enterprise	X							X			X					X		X	
Living							X				X						X	X	
Pollution		X					X				X					X	X		
POR ERDF	X	X				X	X			X	X	X	X		X	X	X	X	

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
POR Apulia 2014-2020			X	
OFIDIA		X		
Rural Development			X	
Waste			X	
Enterprise			X	
Living			X	
Pollution			X	
POR ERDF			X	

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
POR Apulia 2014-2020			X	
OFIDIA	X			
Rural Development		X		
Waste			X	

Enterprise	X			
Living	X			
Pollution	X			
POR ERDF	X	X	X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Existing planning tools, National Risk Assessment, Standardization with the collaboration of the National Civil Protection Department (geo-hydrological risk).
2) OFIDIA researchers have used technology to bridge this resource gap. In order to provide early detection, the system uses automated visual and thermal cameras throughout the forest area. This equipment transmits information via wireless to one of the five central control rooms of the latest generation that the project established in Lecce, Brindisi, Bari and Ioannina, where they are then used to coordinate the individual shutdown operations.
3) Support for vocational training and acquisition of skills; Support for information actions, short-term inter-company exchanges in the agricultural and forestry sector, use of consulting services by companies, training of consultants, improvement and sustainability of the company's overall performance (restructuring), infrastructure investments for the development, modernization or adaptation of agriculture and forestry, non-productive investments related to the fulfillment of environmental agri-climate objectives, in preventive actions aimed at reducing the consequences of probable natural disasters, adverse weather conditions and catastrophic events. Business start-up aid for young farmers, small farm development. Support for the installation, improvement and expansion of broadband infrastructures and passive infrastructures for broadband. Support for

forestation/afforestation, installation and maintenance of agro-forestry systems, prevention of damage to forests from fires, natural disasters and catastrophic events. Aid for investments designed to increase the resilience and environmental value of forest ecosystems. Payments for conversion into organic farming practices and methods and for animal welfare. Support for the development of new products, practices, processes and technologies in the agri-food and forestry sector. Support for cooperation between small operators to organize joint work processes and share facilities and resources and for the development and/or marketing of tourism services related to rural tourism. Support for supply chain cooperation. Support for joint actions for climate change mitigation and adaptation; for the sustainable production of biomass to be used in food production, energy and industrial processes.

4) Recovery, storage and redistribution of food and pharmaceutical surpluses and food waste in favor of people in a state of poverty and severe social hardship; recovery and redistribution of food waste unfit for human consumption for the vital support of animals and for the destination to self-composting or community composting with an aerobic method; development of projects, as well as by educational institutions of all levels, with the aim of educating and raising awareness for the dissemination of a correct culture of nutrition, of the responsible consumption, the fight against waste, the sharing of food and other innovative forms of recovery and diffusion of food surpluses, as well as the training of operators, also in order to guarantee the correct management practices in the supply chain recovery, collection and distribution of food for the purposes of social solidarity; purchase of goods and services useful for efficient recovery, conservation and distribution of goods that constitute food and pharmaceutical surpluses or food waste; establishment of locations for the storage and distribution of food and pharmaceutical surpluses and food waste, including the facilities for the preservation of the fresh product also including the endowment of cold rooms. The storage and distribution of medicines is carried out in compliance with the provisions on the collection of unused medicines; establishment of local networks between recognized active subjects in the agri-food and third sector; promotion of initiatives for the development and implementation of IT systems, applications and / or web platforms aimed at facilitating the recovery and redistribution of food surpluses and waste; adoption of preferential criteria in favor of companies that guarantee the lowest volume of food waste and / or their recovery for human or animal consumption or for the destination to self-composting or community composting with an aerobic method; promotion of collaboration agreements for the sale of foodstuffs between companies in the food sector, large-scale retailing, collective catering and private bodies set up for the pursuit, without profit, of civic and solidarity purposes; promotion of food sharing initiatives between individual citizens or organized groups (food sharing) and activities and initiatives aimed at protecting the environment, against negative externalities generated by food surpluses and waste.
5) Energy saving measures; Production of energy from renewable sources; High efficiency cogeneration. The aid amount, calculated on the basis of the eligible costs of the project, cannot exceed for energy saving investments: 25% for medium-sized enterprises; 35% for small-sized

enterprises; for investments in renewable energy sources and in favor of cogeneration: 50% for medium-sized enterprises; 60% for small-sized enterprises.

6) Envisioned measures are: Environmental sustainability in territorial governance tools, water saving, saving and energy supply, criteria for building materials, certification sustainability of building. Environmental sustainability in territorial governance tools consist of: harmonious development of the territory, urban fabrics and productive activities; compatibility of transformation processes and land use with safety, physical integrity and the historical-cultural identity of the territory; the enhancement of identity resources and indigenous productions for healthy and lasting local development; the improvement of the environmental, architectural quality and healthiness of the settlements; the reduction of settlement pressure on naturalistic-environmental systems, through appropriate interventions to mitigate impacts; the reduction of the consumption of new territory, avoiding the occupation of soils of high agricultural and / or naturalistic value, favoring the rehabilitation and recovery of degraded areas and the replacement of existing fabrics or their reorganization and redevelopment to improve their quality and sustainability environmental. Water saving consist of: the preparation of measures to verify the quality and efficiency of the distribution networks also through the monitoring of consumption; the identification of optimal reference standards for drinking water consumption and for the discharges introduced into the sewerage network and the related control systems; the promotion of the use of natural purification techniques; the usage of gray and rainwater recovery techniques.
   Saving supply consist of: the identification of optimal reference standards for energy consumption intended for the winter and summer conditioning of environments, the production of sanitary hot water and lighting; the enhancement of territorial and environmental resources; the enhancement of site-envelope integration; interventions on the casings; interventions on thermal plants supply; interventions on lighting systems;
   energy supply consist of: the extended application of renewable energy sources, both for the production of thermal energy and electricity, also through centralized systems; the application of centralized heating systems for individual buildings or groups of buildings; the application of systems operating in cogeneration / trigeneration dimensioned coherently with the needs of energy needs of the territorial system concerned;
   criteria of buildings materials: they must be ecologically compatible; allow to recover local productive and construction traditions linked to the environmental characteristics of the places; be recyclable, recycled, locally sourced and contain renewable raw materials that last over time or recyclable raw materials; are characterized by reduced energy values and incorporated greenhouse gas emissions; respect the well-being and health of the inhabitants;
   certification sustainability of building: The certification of the sustainability of the buildings is issued by a professional or an organization, unrelated to the design and construction supervision, at the request of the owner of the building or of the subject implementing the intervention.
7) Reduction of light pollution and troublesome lighting, as well as energy savings throughout the regional territory through the rationalization of public and private outdoor lighting systems; improvement of construction features and efficiency of lighting systems; uniformity of design criteria

for improving lighting quality and improving road traffic safety through careful lighting design to guarantee energy and cost savings; evaluation of lighting systems for green areas in urban areas; the ban on the installation of high-power public lighting systems that can disturb the fauna in any areas of natural vegetation.

8) The envisioned measures are based on different reference axes: Priority axis I: Research, technological development and innovation - FSE Investment priorities: Strengthen the infrastructure for research and innovation (R&I) and the capacity to develop excellence in RESEARCH&INNOVATION and promote centers of competence, in particular those of European interest; Promote business investment in R&I; Strengthen the regional innovative system. Priority axis II: Improving access, use and quality of ICT - FSE Investment priorities: Extend the spread of broadband and the launch of high-speed networks and support the adoption of networks and technologies in the field of digital economy; Develop ICT products and services, e-commerce and ICT demand; Strengthen ICT applications for e-government, e-learning, e-inclusion, e-culture and e-health. Priority axis III: competitiveness of small and medium-sized enterprises - FSE Investment priorities: Promoting entrepreneurship, in particular by facilitating the economic exploitation of new ideas and promoting the creation of new companies; Develop and implement new business models, in particular for internationalization; Support the creation and expansion of advanced capabilities for the development of products and services; Support the ability of Small-Medium Enterprises to grow on regional, national and international markets and take part in innovation processes.
Priority axis IV: Sustainable energy and quality of life - FSE Investment priorities: Promote energy efficiency and the use of renewable energy in companies; Support energy efficiency, intelligent energy management and renewable energy use in public infrastructure, including public buildings, and in the housing sector; Develop and implement intelligent distribution systems operating at low and medium voltage; Promote low-carbon strategy for all types of territory, in particular urban areas, including the promotion of sustainable multimodal urban mobility and relevant adaptation and mitigation measures.
Priority axis V: adaptation to climate change, risk prevention and management - FSE Investment priorities: Promote investments to address specific risks, guaranteeing resilience to disasters and developing disaster management systems.
Priority axis VI: Protection of the environment and promotion of natural and cultural resources - FSE Investment priorities: Investing in the waste sector to meet the obligations imposed by the Union's environmental legislation and to meet the needs, identified by the Member States, of investments that go beyond these obligations; Investing in the water sector to meet the obligations imposed by the Union's environmental legislation and to meet the needs, identified by the Member States, of investments that go beyond these obligations; Preserve, protect, promote and develop the natural and cultural heritage; Protecting and restoring biodiversity and soils, promoting ecosystem services, including through Natura 2000 and green infrastructure; Act to improve the urban environment, revitalize cities, redevelop and decontaminate abandoned industrial areas (including conversion areas), reduce air pollution and promote noise reduction measures.

Priority axis VII: Transport systems and network infrastructures - FSE Investment priorities: Improve regional mobility, by connecting secondary and tertiary nodes to TEN-T infrastructure, including multimodal node; Develop and improve environmentally sustainable transport systems (also low noise) and low carbon emissions, including inland waterways and maritime transport, ports, multimodal connections and airport infrastructure, in order to promote sustainable regional and local mobility; Developing and restoring global, high quality and interoperable rail transport systems, and promoting noise reduction measures. Priority axis VIII: Promote sustainability and quality of employment and support for professional mobility - FSE Investment priorities: Increase the employment of immigrants; Encourage job placement and employment of long-term unemployed and those with greater difficulty in entering work, as well as supporting people at risk of long-term unemployment; Increasing the employment of young people; Increasing female employment; Encourage permanence at work and relocation of workers involved in crisis situations; Improve the effectiveness and quality of services at work.
Priority Axis IX: Promote social inclusion, the fight against poverty and all forms of discrimination - FSE Investment priorities: Promoting social inclusion and combating poverty; Encouraging increased employability and articipation in the labor market; Strengthening the social economy; Increase, consolidation and qualification of care and socio-educational services; Increase, consolidate, qualify the socio-educational services and infrastructures aimed at children and health and social services aimed at people with limitations of autonomy and strengthen the infrastructural network and the offer of territorial health and social-health services.
Priority axis X: Investing in education, training and lifelong learning - FSE Investment priorities: Reduction and prevention of early school leaving and promotion of equality of access to good quality pre-school, primary and secondary education, including formal, non-formal and informal learning pathways, which enable education to be resumed and training; Improve the quality and effectiveness of higher education and equivalent level and access to it, in order to crease participation and success rates, especially for disadvantaged groups; Improve adherence to the labor market of teaching and training systems, favoring the transition from education to the world of work and strengthening education and vocational training systems and improving their quality, also through mechanisms for anticipating skills , curriculum adaptation and the introduction and development of work-based learning programs, including dual learning and apprenticeship systems.
Priority axis XI Strengthen the institutional capacity of the authorities - FSE Investment priorities: Investment in institutional capacity and in the effectiveness of public administrations and public services at national, regional and local level in view of reforms, better regulation and good governance.
Priority axis XII Sustainable Urban Development - FSE Investment priorities: The axis "sustainable urban development", built in implementation of Articles 7-8 of Reg. 1301/2013, is divided into two actions concerning: Sustainable urban regeneration, with particular regard to peripheral areas and public housing districts of medium-sized cities, to improve the conditions of habitability, comfort and quality of life. (Investment priorities: 4c, 4e, 5b, 6b, 9b), Ecological requalification of production

areas, through interventions that reduce the pressure on the environment and health, improve the infrastructural endowment and enhance its relations with the rural and urban territory (Investment priorities: 4c; 4e; 6e). Priority axis XIII Technical assistance; Improve the efficiency, effectiveness and quality of the financed interventions, as well as verifying and controlling them.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
POR Apulia 2014-2020		X	X	X	
OFIDIA		X			
Rural Development		X		X	
Waste		X		X	
Enterprise		X			
Living		X		X	
Pollution		X		X	
POR ERDF	X	X	X	X	

4.8.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Economic Operators, Competence Centres (CNR, ARPA, INGV, etc.), Entities and Public Administrations, Volunteering, Professional Orders.
2) Municipality of Bari, Brindisi, Lecce, Ioannina, Italian and Greek civil protection.
3) Potential beneficiaries and current beneficiaries; professional organizations; economic and social parts; local authorities and other competent public authorities at the territorial level; training and information centres; organisms for promoting social inclusion, gender equality and non-discrimination; operators or promoters of projects; environmental protection organizations; consumers.
4) Apulia Region District; associated municipalities in social territorial areas; private bodies; manufacturing enterprises; distributors and retailers; single or associated agricultural entrepreneurs; agricultural producer organizations; associations of organizations of agricultural producers; managing bodies of school, companies, hospitals, social and community canteens.
5) Small and medium enterprises, citizens.
6) Municipalities of Apulia Region, citizens and building companies.
7) Metropolitan City; municipalities of Apulia Region, Regional Parks, citizens, Astronomical observatories and associations; electricity companies and installers; designers.
8) Municipalities of Apulia Region, private companies, citizens.

What are their roles and responsibilities?

1) Professional roles and responsibilities for the Technicians, both public and private; public relationship between public Institution and Citizens.
2) More effective scientific cooperation between research institutions in the area, to the benefit of the population.
3) Professional roles and responsibilities for the Technicians, both public and private; public relationship between public Institution and Citizens.
4) Civic and solidarity roles, corporate social responsibility during the interventions in favor of fight against food waste.
5) Technical and professional responsibilities.
6) More effective scientific cooperation between research institutions in the area, to the benefit of the population.
7) They collaborate together to identify plants of significant light pollution and environmental impact to be subjected to reclamation. They must have a careful and scrupulous evaluation of the lighting systems for the green areas in urban and extra-urban areas, in order to avoid, in particular, the

present birdlife and the plants themselves disturbances and consequent disruptions of their biological cycle.

8) They collaborate together to identify plants of:
smart growth: developing a knowledge-based economy on innovation, focusing on innovation, education, training, training continuous and digital society; sustainable growth: promoting a more efficient economy in terms of resources, greener and more competitive, acting on competitiveness, fighting against climate change, clean and efficient energy; inclusive growth: promoting an economy with a high employment rate than it favors social and territorial cohesion, cultural diffusion and construction of civic resources focusing on employment, skills, fighting poverty, greater accessibility to services to people and quality of life.

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
POR Apulia 2014-2020	X		
OFIDIA	X		
Rural Development	X		
Waste	X		
Enterprise	X		
Living	X		
Pollution	X		
POR ERDF	X		

4.8.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) Implementation of the existing Cohesion Policy, POR Apulia FESR FSE 4.0 version.
2) Don't know.
3) Don't know.
4) Waste management policies, in key of realization of a circular economy for a social solidarity.
5) Growth and expansion policies of the employment basis.
6) The strategy is integrated into new existing sector policies; they are Directive 2002/91 / EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings and in line with Directive 2006/32 / EC of the European Parliament and of the Council.
7) Yes; for example National Law n.9 of 9th January 1991, (Rules for the implementation of the new national energy plan: institutional aspects, hydroelectric and power lines, hydrocarbons and geothermal energy, self-production and fiscal provisions) and National Law on the 9th January 1991, n. 10 (Rules for the implementation of the national energy plan on the rational use of energy, energy saving and development of renewable energy sources) for the implementation of the national energy plan.
8) Yes; the Regione Puglia 2014-2020 POR FESR strategy aimed at ensuring continuity with the actions implemented within the 2007-2013 Programming.

4.8.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2014-2020
2) 2013-2015
3) 2014-2020
4) start 2017
5) The foreseen initial-end dates of implementation of each measure depend on terms set by the calls.
6) start 10/06/2008
7) start 2006
8) 01/01/2014 to 31/12/2023

State of the implementation

	Not started	In progress	Delayed	Completed	Other
POR Apulia 2014-2020		X			
OFIDIA				X	
Rural Development		X			
Waste		X			
Enterprise		X			
Living		X			
Pollution		X			
POR ERDF		X			

Reasons of deviations, if any

1) None
2) None
3) None
4) None
5) None
6) None
7) None
8) None

Funding

1) SIE 2014-2020 funds.
2) "Regional research and innovation" operational program for the 2007-2013 programming period.
3) European Agricultural Fund for Rural Development (EAFRD), leading fund.
4) Special current portion fund for the financing of regional laws that are finalized after the approval of the budget.
5) -
6) -
7) -
8) Public and European funding

Allocated budget [€]

1) € 16.000.000.
2) € 1.301.263,000.
3) 1.637.900.000,00 (Transfer of knowledge and information actions € 25.000.000,00; Consultancy, replacement and assistance services for farm management € 21.000.000,00; Quality schemes for agricultural and food products € 8.000.000,00; Investments in tangible assets € 555.000.000,00; Restoration of agricultural production potential damaged by natural disasters and by catastrophic events and introduction of adequate prevention measures € 20.000.000,00; Development of farms and businesses € 170.000.000,00; Basic services and renovation of villages in rural areas € 15.000.000,00; Investments in the development of forest areas and improvement of the profitability of forests € 110.000.000,00; Establishment of associations and producer organizations € 5.000.000,00; Agri-climate and environmental payments € 215.000.000,00; Organic farming € 190.000.000,00; Natura 2000 indemnity € 12.000.000,00; Animal welfare € 10.000.000,00; Cooperation € 81.000.000,00; Leader € 158.000.000,00; Technical Assistance € 42.900.000,00).
4) 600.000 € for financial year 2017
5) -
6) -
7) -
8) 7.120.958.992

4.8.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
POR Apulia 2014-2020			X	
OFIDIA			X	
Rural Development			X	
Waste	X			
Enterprise			X	
Living			X	
Pollution			X	
POR ERDF			X	

How are the outcomes of the Strategy evaluated?

1) -
2) Monitoring
3) -
4) -
5) -
6) -
7) -
8) Monitoring

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) Municipalities of Apulia Region
2) Apulia Region and Epiro Region
3) Scientific communities, ARPA (Regional Agency for Environmental Protection)
4) Apulia Region
5) Apulia Region District
6) Municipalities exercise the monitoring, verification and control, in agreement with the Region, on the implementation of the interventions referred to in this law, in order to verify the regularity of the documentation, as well as the compliance of the works carried out with the project results.
7) The Region, through the regional Office responsible for environment and environmental planning and a technical committee of expert environmental planners and competent professionals, in concert with the professional orders and colleges, to ensure a homogeneous application of the rules of this law: it exercises the functions of coordination and direction in matters of energy saving and reduction of light pollution.
8) Yes; there are authorities responsible for the management Financial, Control and Audit; MIRWEB (Final Beneficiary Monitoring - external to Apulia Region); MIR system (Monitoring of projects - Regional Beneficiary Apulia Region).

What are identified as the main strengths of the Strategy?

1) Monitoring activities and operational tools for risk prevention; updating of municipal emergency plans; development of forecasting and risk management systems and modernization of the monitoring network.
2) Use of high technology instruments.
3) Regional Law n. 44 del 19/12/2008 on the containment of dioxin emissions. Law on the containment of benzo (a) pyrene levels. Legislative Decree 13 August 2010, n. 155, on "Implementation of Directive 2008/50 / EC relating to air quality, the environment and for cleaner air in Europe, Plan containing the first intervention measures for the improvement of air quality in the "Tamburi" district of Taranto, Plan containing the first intervention measures for the restoration of air quality in the municipality of Torchiarolo (BR) for the pollutant PM10.
4) -
5) Investments in favor of environmental protection relating to the envisaged measures are facilitated. If the investments are completed within the terms indicated in the concession provision of structures, the aid intensity is increased by 5 percentage points.

6) Reductions municipal taxes, secondary urbanization charges or construction costs; increments up to 10 percent of the volume allowed by the planning instruments in force for the new construction and expansion, replacement and renovation of existing buildings.
7) -
8) Incentives for small and medium-sized enterprises; economic growth; variety and breadth of environmental, cultural and human resources.

What are identified as the main weaknesses of the Strategy?

1) The implementation times could be longer than the deadline.
2) Accurate forecast of weather conditions.
3) Lack of historical series, for some pollutants, of air quality data for the evaluation of the effectiveness of plans and programs already applied, Failure to reduce polluting emissions deriving from the production of energy from fossil sources, against an increase in the production of energy from renewable sources, Increase in emissions of pollutants linked to the development of industrial activities.
4) -
5) Ratio between tax breaks and time to return on investment.
6) -
7) -
8) Settlement, social and environmental degradation of urban suburbs. Conditions of extreme hardship and housing emergency especially in the cities. Under-greening of areas and services. Depopulation, demographic decline and marginalization of inland areas.

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) Greater awareness and knowledge on the part of citizens on natural risks.
2) By protecting the forests of the regions of Apulia and Epirus from fires, the project contributes to a sustainable quality of life and economic prosperity in the cross-border region.
3) The Evaluator proceeded, through the analysis of the evaluation reports and of the thematic in-depth studies concerning the RDP 2007-2013, the explanation, for each of the six Priorities of rural development, of the useful elements (main evidence) to the reading of the strategy prepared for the 2014-2020 programming period.
4) -

5) -
6) The lessons of the strategy consist in the conscious use of energy resources and the development of sustainable building.
7) Reduction of light pollution and annoying lighting, as well as energy savings.
8) -

4.8.9 REFERENCES

1) https://por.regione.Apulia.it/-/azione-5-1?redirect=%2Fasse-v-adattamento-al-cambiamento-climatico-prevenzione-e-gestione-dei-
2) https://ec.europa.eu/regional_policy/it/projects/italy/a-new-monitoring-system-to-prevent-wildfires
3) https://psr.regione.Apulia.it/web/guest/il-programma
4) http://www.regione.Apulia.it/documents/10192/9593893/LR13.pdf/d527ad84-dccc-4112-b231-cb03a8852493
5) http://www.regione.Apulia.it/documents/10192/5166747/REGOLAMENTO+REGIONALE+21+novembre+2008%2C%20n.+26+%28id+5166772%29/2277e6ff-7295-48a1-a36b-57f53c10e370
6) https://www.anit.it/wp-content/uploads/2015/03/LR132.pdf
7) http://www.regione.Apulia.it/documents/10192/5204730/N109_28_08_06.pdf/6ee58492-13e3-4ce5-8f66-229bbdd42710;jsessionid=F6F6565375ED3074CA76E4DB4A30E471
8) https://por.regione.Apulia.it/documents/43777/75568/Versione+Programma+POR+Apulia+2014-

4.9 SOUTHERN ADRIATIC STRATEGIES: DUBROVACKO-NERETVANSKA COUNTY

4.9.1 GENERAL INFORMATION

Name of the Strategy

1) Environmental protection program for Dubrovačko-Neretvanska County for the period 2018-2021 (Dubrovačko-Neretvanska County)

Type of Strategy

	Adaptation	Mitigation
Dubrovačko-Neretvanska County		X

Type of document that refer to the Strategy

1) Regional program for Dubrovačko-Neretvanska County.

Agency that issued the Strategy

1) Dubrovačko-Neretvanska County

Year of issue

1) 2018

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Dubrovačko-Neretvanska County

4.9.2 CONTEXT

General objectives of the Strategy

1) The main objective of this document is to provide guidelines for coastal planning and management in order to preserve the environment and enable sustainable development.

Description of the Strategy

1) The program analyses current status in different fields of interest (population, economy…) and defines key stakeholders in environment protection. The focus is on 10 sectoral entities (energy, agriculture, fishery…) with specific task to provide measures in the field of: air protection, ozone layer and climate change mitigation, water protection, soil protection, sustainable management of the marine environment and coastal area, preserving biodiversity and environment.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other

Dubrovačko-Neretvanska County	X										State legislative

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…
- UN = United Nation Summits/Reports

4.9.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) No.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) No.

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) No.

Does any scientific organization/institution participate in the Strategy? Which ones?

1) No, any.

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) No, any.

4.9.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
Dubrovačko-Neretvanska County	X	X	X				X	X			X	X	X		X	X		X	Forests

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
Dubrovačko-Neretvanska County		X		

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other

Dubrovačko-Neretvanska County			X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behaviour (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Two measures have been provided: Implement fire protection measures in accordance with the DNŽ Fire Protection Plan and the annual implementation plans for the improvement of the DNŽ fire protection; Exercise, educate and regularly perform exercises, or check readiness according to the plans. Inform and involve the public as an entity in the plans and preparation of the implementation of the plans.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
Dubrovačko-Neretvanska County	X	X			

4.9.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Representatives of cities and municipalities of county departments and other services.

What are their roles and responsibilities?

1) Stakeholders are defined for each sector and measures.

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
Dubrovačko-Neretvanska County	X		

4.9.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) Croatian Energy Development Strategy.

4.9.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2018-2021

State of the implementation

	Not started	In progress	Delayed	Completed	Other
Dubrovačko-Neretvanska County		X			

Reasons of deviations, if any

1) None

Funding

1) Public and European co-financing.

Allocated budget [€]

1) Not available.

4.9.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
Dubrovačko-Neretvanska County	X			

How are the outcomes of the Strategy evaluated?

1) Monitoring.

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) Administrative Department for Communal Affairs and Environmental Protection.

What are identified as the main strengths of the Strategy?

1) Overall current situation in DN county with defined measures through different sectors.

What are identified as the main weaknesses of the Strategy?

1) Lack of future scenarios for climate.

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) To tackle upcoming climate changes, each entity has to provide a program that is interdisciplinary with relevant future scenarios and measurable impact of defined measures.

4.9.9 REFERENCES

1) http://www.edubrovnik.org/wp-content/uploads/2016/03/Tekst-PZO-DNZ-konacno-korigirano.pdf

5 SUPPLEMENTARY STRATEGIES (SUB-REGIONAL LEVEL)

The study led to the analysis of 24 Sub-regional Strategies.

The Sub-regional Strategies collected are 21 for Italy and 3 for Croatia, distributed among Northern, Central, and Southern Adriatic (Figure 3). The Strategies analyzed at Sub-regional level are: 3 for Friuli Venezia Giulia sub-regions including 1 adaptation, 1 mitigation and 1 mitigation and adaptation Strategies; 7 for Marche sub-regions, including 1 adaptation and 6 mitigation Strategies; 11 for Apulia sub-regions, including 5 adaptation and 6 mitigation Strategies; 1 adaptation Strategy for Primorsko-Goranska County; 2 mitigation Strategies for Šibensko-Kninska County. Therefore, the Northern Sub-regional Strategies are 4, the Central Sub-regional Strategies are 9 and the Southern Sub-regional Strategies are 11 (Figure 3).

In the following paragraphs, the Sub-regional Strategies collected are presented.

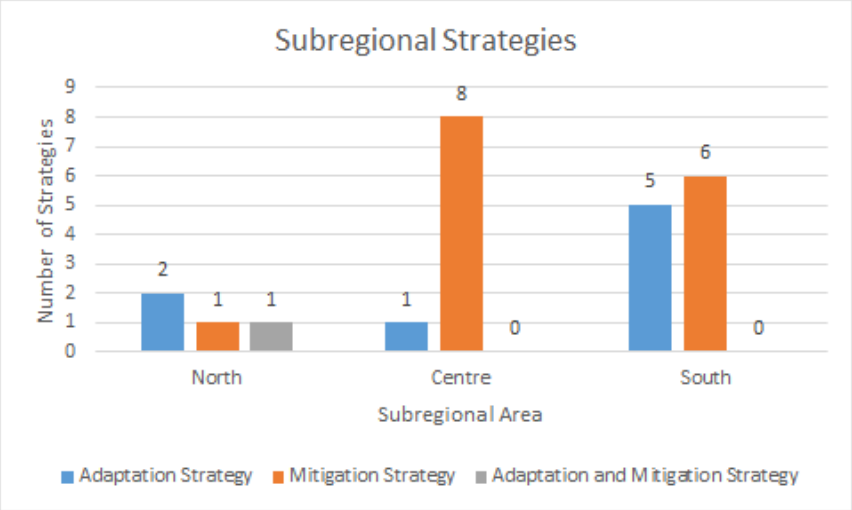

Figure 3.

5.1 NORTHERN ADRIATIC: FRIULI VENEZIA GIULIA REGION (ITALY)

5.1.1 GENERAL INFORMATION

Name of the Strategy

1) Shaping a Holistic Approach to Protect the Adriatic Environment between coast and sea (SHAPE)
2) Sustainable Mobility of Coastal Tourist areas and the Cross-border Hinterland (MobiTour)
3) Action Plan for Sustainable Energy and Climate (SECAP) of Latisana

Type of Strategy

	Adaptation	Mitigation
SHAPE	X	
MobiTour		X
SECAP	X	X

Type of document that refer to the strategy

1) European project
2) Report
3) Sustainable Energy and Climate Action Plan

Agency that issued the Strategy

1) Friuli Venezia Giulia Autonomous Region
2) Friuli Venezia Giulia Autonomous Region
3) Covenant of Mayors

Year of issue

1) 2011
2) 2017
3) 2017

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Adriatic regions including Friuli Venezia Giulia region. Pilot area: Marano and Grado Lagoon
2) Municipality of Lignano Sabbiadoro, Caorle and Portorose and Škocjanske jame Park
3) Municipality of Latisana

5.1.2 CONTEXT

General objectives of the Strategy

1) Shape aimed to develop a multilevel and cross-sector governance system, based on integrated management of natural resources, risk's prevention and conflict resolution among uses of the Adriatic coast and sea.
2) Design Sustainable mobility plans (PUMS) in tourist areas along the coast and in the cross-border hinterland; considering low carbon emissions.
3) Development of mitigation and adaptation actions to create cities and infrastructure more resilient.

Description of the Strategy

1) Contribute to a sustainable development policy and an increasing environmental knowledge to proper management of the marine-coastal system of the lagoon and its resources.
2) Emission reduction through the improvement of the mobility with the aim to reduce congestion and pollution during periods of high tourist flow, encouraging the use of new sustainable mobility services.
3) 41% of CO_2 emission reduction no later than 2030 and adaptation strategy for water, health, planning and communication sectors. SECAP defines concrete strategy and measures to be implemented reduction of energy consumption and emission of GHG, and increased energy production by RES.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
SHAPE	X	X									
MobiTour		X									
SECAP	X	X						X			

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests

- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…
- UN = United Nation Summits/Reports

5.1.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) Yes
2) Yes
3) Yes

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes
2) Yes
3) Yes

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) No
2) No
3) No

Does any scientific organization/institution participate in the Strategy? Which ones?

1) ARPA FVG, OSMER (Regional Meteorological Observatory), OGS (Institute of Geophysics of Trieste)
2) Institute of International Sociology of Gorizia
3) No

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) Regional Civil Protection, Istria Institute for Physical Planning Region
2) No
3) Weproject -Management for urban development-srl

5.1.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
SHAPE		X	X					X											
MobiTour																X			
SECAP				X					X		X							X	

Legend:

- Agr=Agriculture

- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
SHAPE		X		
MobiTour		X		
SECAP			X	

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
SHAPE			X	
MobiTour	X		X	
SECAP	X		X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Implementation of a standing monitoring system in the Marano Lagoon, enables the observation of the behaviour of the lagoon system, focusing on the critical areas.
2) Implementation of equipment for charging and interchange of electric vehicles and bicycles with a coordinated and sustainable design. Purchase of e-charging stations, station for bike sharing, organic system of counting and classification of vehicular flow, stationary cameras in the main road and information panel to indicate the traffic conditions and other communications for citizens.
3) Energy efficiency in public and private buildings, street lighting, development of sustainable mobility, local energy production by RES, reduction of waste production and citizens' awareness. Supervisory measures of flooding, monitoring of air quality and risk analysis for the implementation of measures.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
SHAPE				X	
MobiTour	X				
SECAP	X				

5.1.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Citizens and regional and local politicians
2) Citizens, tourists
3) Citizens

What are their roles and responsibilities?

1) Make observations, proposes new issues, develops integrated coastal zone strategies.
2) Through a survey the stakeholders provide information about the mobility system in the municipality and how this may be improved.
3) Collaboration with the technical group.

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
SHAPE		X	
MobiTour		X	
SECAP	X	X	

5.1.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) EU Marine Strategy Framework Directive
2) Cooperation Program approved by EU
3) Resolution of the City Council of 29.02.2016

5.1.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2011-2014
2) 2017-2020
3) 2016-2030

State of the implementation

	Not started	In progress	Delayed	Completed	Other
SHAPE				X	
MobiTour		X			
SECAP		X			

Reasons of deviations, if any

1) None
2) None
3) None

Funding

1) Project
2) Project
3) Local, regional, national

Allocated budget [€]

1) 4.1 Mln €
2) 1.268.915,75 €
3) 936.450 €, for some measure costs have not been defined

5.1.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
SHAPE	X			
MobiTour			X	
SECAP	X			

How are the outcomes of the Strategy evaluated?

1) Evaluation of ecological services: Hypoxia/anoxia crisis, Environmental sustainability. Environmental impact assessment (VIA) and strategic environmental assessment (VAS) are the common tools to evaluate coastal projects.
2) Not shown.
3) Energy and emission reduction will be monitored with MEI (Monitoring Emission Inventory) which allows to verify the efficiency of the actions.

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) Partners
2) Not shown
3) Technical sector of municipality of Latisana

What are identified as the main strengths of the Strategy?

1) Integration of the traditional environmental monitoring with other techniques, realization of strategic tools to be used for the regional planning of the protection of coastal marine resources.
2) Not shown

3) Not shown

What are identified as the main weaknesses of the Strategy?

1) Efforts and costs for the maintenance of the standing monitoring system
2) Not shown
3) Not shown

What is the main lesson learned, namely the emerging necessities and the opportunities, coming from the Strategy?

1) Many problems related to coastal and sea area transcend regional and national boundaries. A shared approach may allow to better address the global challenges.
2) Not shown
3) Not shown

5.1.9 REFERENCES

1) http://www.shape-ipaproject.eu/Default.asp?p=home
2) https://www.ita-slo.eu/it/mobitour
3) https://mycovenant.eumayors.eu/storage/web/mc_covenant/documents/8/zVqEye5IzMQAsfsoJR4wmnCxHOaf2Z_N.pdf

5.2 NORTHERN ADRIATIC: PRIMORSKO-GORANSKA COUNTY

5.2.1 GENERAL INFORMATION

Name of the Strategy

1) JOINT SECAP

Type of Strategy

	Adaptation	Mitigation
JOINT SECAP	X	

Type of document that refer to the Strategy

1) Interreg Italy-Croatia project

Agency that issued the Strategy

1) Interreg Italy-Croatia

Year of issue

1) 2019

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Primorsko-Goranska County (Cres)

5.2.2 CONTEXT

General objectives of the Strategy

1) Raising awareness of citizens about the risks and appropriate measures related to climate change through workshops, seminars, websites, advertising, and promotional materials. Gathering of data and assessment of climate change risks. Creating a web platform where case studies, climate and energy measures, data on climate change risk will be available for free to all interested stakeholders and citizens.

Description of the Strategy

1) Project JOINT SECAP aims to develop strategies for Climate Change Adaptation in coastal area (pilot areas in Croatia and Italy).

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
JOINT SECAP	X	X		X							

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…
- UN = United Nation Summits/Reports

5.2.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) Yes.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) Not applicable

Does any scientific organization/institution participate in the Strategy? Which ones?

1) ?

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) SDEWES Centre - International centre for sustainable development of energy, water and environment systems.

5.2.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
JOINT SECAP	X	X	X				X	X			X	X	X		X	X		X	

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications

- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
JOINT SECAP			X	

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
JOINT SECAP			X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Raising awareness of citizens about the risks and appropriate measures related to climate change through workshops, seminars, websites, advertising, and promotional materials.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
JOINT SECAP	X			X	

5.2.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) -

What are their roles and responsibilities?

1) -

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
JOINT SECAP			

5.2.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) -

5.2.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2019-?

State of the implementation

	Not started	In progress	Delayed	Completed	Other
JOINT SECAP		X			

Reasons of deviations, if any

1) -

Funding

1) INTERREG Italy Croatia Cross-Border Cooperation Program

Allocated budget [€]

1) 2.094.857,50€

5.2.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
JOINT SECAP				

How are the outcomes of the Strategy evaluated?

1) -

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) -

What are identified as the main strengths of the Strategy?

1) -

What are identified as the main weaknesses of the Strategy?

1) -

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) -

5.2.9 REFERENCES

1) -

5.3 CENTRAL STRATEGIES: MARCHE REGION

5.3.1 GENERAL INFORMATION

Name of the Strategy

1) Addressing coastal erosion in Marche region (Coastal erosion)
2) Sustainable Energy Action Plan (SEAP) - Ancona
3) Sustainable Energy Action Plan (SEAP) - Pesaro
4) Sustainable Energy Action Plan (SEAP) - Senigallia
5) Sustainable Energy Action Plan (SEAP) - Fermo
6) Sustainable Energy Action Plan (SEAP) - San Benedetto del Tronto
7) Sustainable Energy Action Plan (SEAP) - Civitanova Marche

Type of Strategy

	Adaptation	Mitigation
Coastal erosion	X	
SEAP - Ancona		X
SEAP - Pesaro		X
SEAP - Senigallia		X
SEAP - Fermo		X
SEAP - San Benedetto del Tronto		X
SEAP - Civitanova Marche		X

Type of document that refer to the Strategy

1) Regional Coastal Management Plan
2) Municipal Resolution
3) Resolution of the municipality of Pesaro
4) Municipal Council Resolution
5) Resolution of the Municipality Council
6) Recommendation of Municipal Council
7) Municipal Resolution

Agency that issued the Strategy

1) Ministry of the Environment, Land and Sea
2) Ancona Municipality
3) Pesaro Municipality
4) Senigallia Municipality
5) Fermo Municipality
6) San Benedetto del Tronto Municipality
7) Civitanova Marche Municipality

Year of issue

1) 2007
2) 2008
3) 2012
4) 2019
5) 2011
6) 2013
7) 2011

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) A section of coast between the municipalities of Sirolo and Numana
2) Municipality of Ancona
3) Municipality of Pesaro
4) Municipality of Senigallia
5) Municipality of Fermo
6) Municipality of San Benedetto del Tronto
7) Municipality of Civitanova Marche

5.3.2 CONTEXT

General objectives of the Strategy

1) The main objectives are to protect beach areas and cliffs against erosion; to protect settlements and the tourism-based economy of the area; to address the imbalance between sediment erosion and accretion along the coast; to reduce the environmental and landscape impacts of coastal defence; to strengthen the opportunities of the shoreline; to improve nature protection.
2) Reduce municipal CO_2 emissions by 2020 compared to the 2005 level.
3) 20% reduction in greenhouse gas emissions compared to 2005.
4) The implementation of 54 actions elaborated, will lead to reduce CO_2 emission by nearly 61 thousand tons with respect to the trend scenario, consisting in a reduction target of more than 22%, the pro-capita emissions compared to the year 2005.
5) Reduce CO_2 emissions in the respective territories by more than 20% by 2020 through the adoption, subsequent implementation and monitoring of the SEAP - Sustainable Energy Action Plan (SEAP - Sustainable Energy Action Plan).
6) 20% CO2 emission reduction.
7) 20% CO2 gas emission reduction compared to 2005.

Description of the Strategy

1) The strategy consists of three types of adaptation options already used at European level and implemented in this particular case: beach and shoreface nourishment, cliff stabilisation and retreat from high-risk area.

2) To reduce CO_2 emissions by 128 tons, 42 actions have been developed to be undertaken in the medium and long term. The interventions concern the industrial and transport sectors.
3) Pesaro has joined the Covenant of Mayors initiative promoted from the European Union with the aim of reducing by 2020 at least 20% of its own carbon dioxide emissions compared to 2005 emissions, the year chosen for the implementation of the inventory of basic emissions.
4) Identify the specific goal for the municipality; study of ways to reduce emissions; make the plan.
5) Creation of an Internal Coordination Structure and the activation of a participatory process with involvement of local stakeholders to reduce the CO_2 emissions.
6) 48 actions elaborated by the municipal administration, whose implementation will lead to 64 thousand tons CO_2 emissions reduction, corresponding to nearly 22% of the per-capita emissions compared to the year 2005. 65% of reduction emission is achieved in the energy efficiency field, while 18% is realized in the renewable energy sector.
7) Commitment to increase energy efficiency and the use of renewable energy sources.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
Coastal erosion	X	X						X	X	X	
SEAP - Ancona	X		X					X	X	X	
SEAP - Pesaro		X						X	X		
SEAP - Senigallia	X	X						X	X		
SEAP - Fermo	X	X						X	X		
SEAP - San Benedetto del Tronto	X	X						X	X		
SEAP - Civitanova Marche	X	X						X	X	X	

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…
- UN = United Nation Summits/Reports

5.3.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) The strategy is based on the observed situation along the coastal zone between Numana and Sirolo, in particular San Michele beach, the base of the sea-cliff of Mount Conero and the Musone River, in the south of the beach area in Numana.
2) Yes, it is. The Strategy was born because of the climate change problem. The gas emissions influence constantly into climate change, so it needs to reduce CO_2 emissions and use new resources. They used the ECORegion software to analyse the gas emissions.
3) Yes, it is. Every stakeholder has to study the climate and pollution situation in its area with the best available science, to realize a plan.
4) Yes, it is. The Strategy is based on the real problem of climate change and the severe air pollution. In the studying phase they use the EcoRegion tool.
5) Yes, it is. The strategy refers to the climate change problem considering the air pollution. They used the software ECORegion to calculate the energy consumption values and the corresponding emissions.
6) Yes, it is. The strategy refers to the gas emissions that influence climate change. They use the ECORegion software to draw up the balance of CO_2 emissions.
7) Yes, it is. The strategy is born because of the problem of climate change influenced by polluting gas emissions. They used the ECORegion software to make the analysis.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes, the coast, which has withdrawn due to erosion, there is a risk of storms and floods, in particular storm surges. It is necessary to reduce the risks of landslides along the coastal cliffs.
2) Human health and environment vulnerability and climate risk like global warming and hazardous gas emissions.
3) Human Health vulnerability and the climate risk depending on gas greenhouse effects.
4) Human Health and environmental vulnerability, climate risks and air pollution problem.
5) Human Health and environment vulnerability and the influence of air pollution in climate risk.
6) Human health and environmental vulnerability and climate risk due to polluting emissions.
7) Human health and environmental vulnerability and the climate risk problem.

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) Not in this case, because the strategy refers to a problem (the erosion) that afflicts this particular coastal zone of le Marche region, but it doesn't debate about transboundary risks.
2) No.
3) No.
4) No.
5) No.
6) No.
7) No.

Does any scientific organization/institution participate in the Strategy? Which ones?

1) Central Institute for Scientific and Technological Research Applied to the Sea (ICRAM, part of ISPRA)
2) Marche University
3) Polytechnic University of Marche, National Institute of Bio-architecture
4) Marche University
5) Marche University

6) Marche University
7) Marche University

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) National Institute for Environmental Protection and Research (ISPRA); Ministry of the Environment, Land and Sea
2) Società Sviluppo Marche S.p.A. (SVIM)
3) Service Quality Environment, Marche Development Company
4) Società Sviluppo Marche S.p.A. (SVIM)
5) Società Sviluppo Marche S.p.A. (SVIM)
6) Società Sviluppo Marche S.p.A (SVIM)
7) Società Sviluppo Marche S.p.A. (SVIM)

5.3.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
Coastal erosion			X												X				
SEAP - Ancona	X	X	X	X			X				X	X	X	X		X	X		
SEAP - Pesaro	X						X				X	X	X	X		X	X		

SEAP - Senigallia	X	X	X				X				X	X		X		X	X		
SEAP - Fermo	X	X	X								X	X	X	X		X	X		
SEAP - San Benedetto del Tronto	X	X	X			X	X				X	X	X	X		X	X		
SEAP - Civitanova Marche	X	X	X	X			X				X	X	X	X		X	X		

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure

- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
Coastal erosion			X	
SEAP- Ancona			X	
SEAP - Pesaro			X	
SEAP - Senigallia	X			
SEAP - Fermo			X	
SEAP - San Benedetto del Tronto			X	
SEAP - Civitanova Marche			X	

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
Coastal erosion		X		
SEAP- Ancona	X		X	

SEAP - Pesaro	X		X	
SEAP - Senigallia	X		X	
SEAP - Fermo	X		X	
SEAP - San Benedetto del Tronto	X		X	
SEAP - Civitanova Marche	X		X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Beach nourishment: an artificial placement of sand on an eroded shore to maintain the amount of sand present in the foundation of the coast, and this way to compensate for natural erosion and to a greater or lesser extent protect the area against storm surge; stabilization techniques include methods to increase the stability of the slope and measures to reduce marine erosion at the foot of the cliffs and other consequences such as landslide, collapse and falling of rocks; Retreat from high-risks area refers to the relocation of settlements, infrastructure and productive activities from the original location due to high exposure to risks such as floods, sea-level rise and storm surges.
2) Phase I - Beginning: establishment of an internal coordinating structure and involvement of stakeholders with participatory processes;
   Phase II - Planning: a study of the supply and demand of energy in the communal territory inorder to identify the users with the most critical issues, report of energetic consumptions and CO_2 gas emissions, measurement of energy consumption of the municipality, evaluate the energetic efficiency of the different sectors, highlight the strategic areas of intervention, elaborate a baseline

GHG emission level to be considered as reference for the objectives of the plan, drafting of the SEAP;
Phase III - Implementation: put in act of energy saving actions to increase the use of renewable sources, communication and training;
Phase IV - Monitoring and Reporting: Evaluation of the objectives achieved and reporting to the Covenant of Mayors Office.

3) Target identification to be achieved; elaboration of 39 actions of the plan that will allow to reduce CO_2 emissions by about 123 thousand tons compared to the trend scenario (sectors: energetic, urban, transport).
4) Phase I - Goodwill: provides for the creation of an Internal Coordination Structure and participatory involvement of stakeholders;
Phase II - Planning: the energy balance of the Municipality is realised, and the plan is drawn up;
Phase III - Implementation: of the plan measures;
Phase IV - Monitoring and Reporting: verification of the results achieved.
5) Phase I - Start-up: it involves the creation of an Internal Coordination Structure and the activation of a participatory process with involvement of local stakeholders;
Phase II - Planning: Energy Balance / Issue of the Municipality is drawn up and the Plan document (SEAP) is drawn up and forwarded to the Covenant Mayors Office;
Phase III - Implementation: the measures contained in the SEAP are implemented;
Phase IV - Monitoring and Reporting: verification of the results achieved and reporting to the Covenant of Mayors Office.
6) Phase I - Start-up: provides for the creation of an Internal Structure of Coordination and activation of a participatory process with the involvement of local stakeholders;
Phase II - Planning: Energy/Emissive Budget of the Municipality is realized and the Plan document (PAES) is drawn up and forwarded to the Covenant of Mayors Office;
Phase III - Implementation: the measures contained in the SEAP are implemented;
Phase IV - Monitoring and Reporting: checking the results achieved and reporting to the Covenant of Mayors Office.
7) Analysis of energy consumption and CO_2 emissions:
Phase I - Start: creation of Internal Coordination Structure and stakeholder involvement;
Phase II - Planning: energy / emission balance and PAES drafting;
Phase III - Implementation: implementation measures PAES;
Phase IV - Monitoring and Reporting: check results achieved.

Policy instruments envisaged to implement the Strate

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
Coastal erosion				X	
SEAP- Ancona	X	X		X	
SEAP - Pesaro	X			X	
SEAP - Senigallia	X			X	
SEAP - Fermo	X			X	
SEAP - San Benedetto del Tronto	X			X	
SEAP - Civitanova Marche	X	X		X	

5.3.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) The strategy involved local citizens, tourism operators, fishing and tourism sectors' key stakeholders.

2) Ancona Municipality, Marche Region, Project Manager PAES, AnconaAmbiente S.p.A., Multiservizi S.p.A., Conerobus S.p.A., Enel Distributore S.p.A.-Ancona, Energy Resource S.p.A.
3) Pesaro Municipality, Service Quality Environment, Marche Development Company, Marche University, National Institute of Bio-architecture, Marche Multiservizi Group, Hospital Company Marche Nord, trade associations, orders and professional colleges.
4) Senigallia Municipality, Regional development agency SVIM, Marche University.
5) Fermo Municipality, Marche University, SVIM, CONFINDUSTRIA (FM), CONFAPI, Assessor Agricultural and Artisan Businesses (CGIA – CNA – CLAI-COLDIRETTI-CIA-CIPA), Small and Medium Enterprise (P.M.I.), Chamber of Commerce (FM), Business companies and Environmental Associations.
6) San Benedetto del Tronto Municipality, Start S.p.A., Sanbenedettesi taxi driver Association, Confcommercio, Confesercenti, Confindustria Turismo, Tourist Consortium "Riviera delle Palme", citizens, Codacons, educational institutions, Legambiente, Quatieri Committees.
7) Civitanova Marche Municipality, Marche Region, Marche University, Transport, Energy Production, Residential Sectors.

What are their roles and responsibilities?

1) Their responsibilities are to strengthen protection against storms and other risks, improve recreational opportunities and strengthen nature protection, following the principles and objectives of the work itself.
2) Ancona Municipality: coordination, organization of energy sustainability public initiatives, financing adjustments. Marche Region: financing adjustments. Energy Resource S.p.A.: supply of photovoltaic systems for schools. AnconaAmbiente S.p.A., Multiservizi S.p.A., Conerobus S.p.A., Enel Distributore S.p.A.-Ancona: lower polluting emissions by modifying or improving the equipment used.
3) Municipality is responsible for the initiative (energy manager); National Institute of Bio-architecture: Adaptation of the Municipal Building Regulations and the Bio-architecture Regulations, promotion of energy efficiency in the homes of private citizens; business associations of hoteliers and lifeguards: promotion of cogeneration in annual hotels with more than 100 rooms and with swimming pool, promotion at the lifeguards of the installation of solar thermal panels; Confindustria and trade associations of production sector and trade activities sharing efficiency improvements with the Confindustria energy manager in the secondary sector (lighting, more efficient motors and inverters), installation of renewable energy systems to reduce energy dependency, promotion of interventions of co- tri-generation at large shopping centers; Marche Nord Hospital: sharing of measures in the planning process of the Hospital for the improvement of the energy efficiency of hospitals on the plant side; evaluation of further possible measures to be developed (interventions in energy efficiency of the real estate); Marche Multiservizi Group: recovery of the actions planned

by the Group to improve the integrated waste management system, comparison of possible measures to be performed in the field of public lighting and more generally efficiency energy (district heating); SVIM, Marche University and National Institute of Bio-architecture: technical support.

4) Municipality: project manager; Regional development agency SVIM support the Municipality in the decision phase; Marche University helps in the study phase. Every stakeholder provides to communicate and advertise the Plan.
5) Municipality: project manager; Marche University and SVIM: Assistance and technical and operational support; Environmental Associations: Information initiatives in collaboration with the Municipality. All the other: use of heat pumps whenever possible, purchase of a new centrifuge for purifiers, installation of solar panels, recycling of waste, purchase of methane minibuses.
6) Municipality: project manager, redevelopment interventions and territorial planning; Sanbenedettesi taxi driver Association: buying fewer polluting cars; Industrial sector: engine interventions and purchase of inverters; Energy production sector: incentive use of photovoltaics.
7) Civitanova Marche Municipality, Marche Region founds and administration; Marche University: analysis process; Transport, Energy Production, Residential Sectors: emission reductions.

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
Coastal erosion	X		
SEAP- Ancona	X	X	
SEAP - Pesaro	X	X	
SEAP - Senigallia	X	X	
SEAP - Fermo	X	X	
SEAP - San Benedetto del Tronto	X	X	
SEAP - Civitanova Marche	X	X	

5.3.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) The strategy is based on the approaches presented in the Marche region's 2005 Integrated Coastal Area Managed Plan
2) Resolution of the municipal council n. 66 of 26.05.2008
3) City Council Resolution n. 155 of 10/12/2012, Europe 2020 Strategy
4) Resolution of the Municipality Council n. 35 of the 29/05/2019, European 2020 Strategy
5) Recommendation n. 67 of the 15/09/2011, European 2020 Strategy
6) Resolution of Municipal Council n. 7 of the 24/01/2013
7) Municipal Council Resolution n. 58 of 03.10.2011

5.3.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2007-2016 and beyond
2) 2008-2020
3) 2014-2020
4) 2019-2020
5) 2011-2020
6) 2013-2020
7) 2011-2020

State of the implementation

	Not started	In progress	Delayed	Completed	Other
Coastal erosion		X			

SEAP- Ancona		X			
SEAP - Pesaro		X			
SEAP - Senigallia		X			
SEAP - Fermo		X			
SEAP - San Benedetto del Tronto		X			
SEAP - Civitanova Marche		X			

Reasons of deviations, if any

3) None
4) None
5) None
6) None
7) None
8) None
9) None

Funding

1) The Ministry of the Environment, Land and Sea and the Central Institute for Scientific and Technological Research Applied to the Sea.
2) Ancona Municipality and financing from public or private bodies.
3) Pesaro Municipality and co-financing.
4) Municipality and regional and provincial co-financing.
5) Municipal, regional and provincial founds.
6) Municipality, Marche Region, Province and Public or Private service.
7) Civitanova Marche Municipality, Marche Region and financing public or private body.

Allocated budget [€]

1) 8.6 million euros (cost of the works)
2) Environmental sector: € 623.833; IT sector and innovation: € 21.000; School building sector: € 1.221.450; Environmental and communication sector: € 30.000/40.000 for each intervention; Residential construction sector: € 2.000.000 + 5.614.760; Multiservice S.p.A.: € 360.000 + 85.000 150.000. It is not possible to estimate costs for many other sectors.
3) The values are not available as many of the evaluation sheets for the planned activities still have to be completed.
4) Not quantified.
5) € 5.000 "Pedibus" awareness raising and testing primary schools campaign; € 80.000 Construction of a pedestrian walkway in via dei Mille - school complex; € 3.000 Awareness and experimentation campaign for school car sharing in primary schools; € 163.000 Realization of multi-purpose field parking lot - Exchange parking "A" (€ 32.000 by the Municipality and € 131.000 by the Marche Region; € 600.000 Lift system between Viale Ciccolungo - Carriera - XX Settembre - Vittorio Veneto (€300.000 by the Municipality and € 300.000 by the Marche Region); € 1.073.000 Lift system between the Orzolo car park and the Historic Center; € 200.000 Extension of the Orzolo parking area - 1st section - with pedestrian paths to the center; € 5.000 Public Local Transport.
6) Not quantified.
7) Not quantified.

5.3.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
Coastal erosion	X			
SEAP- Ancona	X			
SEAP - Pesaro	X			

SEAP - Senigallia	X			
SEAP - Fermo	X			
SEAP - San Benedetto del Tronto	X			
SEAP - Civitanova Marche	X			

How are the outcomes of the Strategy evaluated?

1) Highlighting the potential changes in the environment after beach nourishments; monitoring the expected benefits and the areas' ability of restoration; indicating different measures to be implemented in order to overcome and mitigate the impacts.
2) Monitoring.
3) Monitoring and verification.
4) Monitoring and evaluation.
5) Monitoring and reporting.
6) Monitoring and reporting.
7) Monitoring and reporting.

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) ISPRA and ARPA.
2) Different municipal administration: public procurement, spatial planning, citizen and stakeholder involvement, residential, industrial, tertiary, for any sector.
3) Municipality, Service Manager Environmental Quality, Enel and Multiservice Marche.
4) municipal sectors: administration, territorial planning, public procurement, involvement of citizens and stakeholders, industrial, tertiary sector, transport.
5) Municipal sectors: "Municipal Administration", "Planning Territorial", “Public Procurement”, “Involvement of Citizens and Stakeholders”, "industrial", "tertiary".
6) Municipal sectors: "Municipal Administration", "Planning Territorial", “Public Procurement”, “Involvement of Citizens and Stakeholders”, “Residential”, “Industry”, “Tertiary”.

7) Municipal Administration: planning and territory, public procurement, citizen and stakeholders involvement, residential, industrial, tertiary.

What are identified as the main strengths of the Strategy?

1) Use of cost and benefit analysis to strengthen project planning; strong public information, stakeholder consultation and cooperation with local communities.
2) Cooperation and the importance of emission reduction.
3) Importance of the environmental problem, involvement of stakeholders and citizens.
4) Involvement of the Municipality and non-political stakeholders.
5) A sustainable policies path which foresees the strong involvement of citizenship and of all community sectors, and their increased awareness of the importance to save energy consumption and make the best out of photovoltaic and solar thermal systems applied to residential buildings.
6) Cooperation public and private sectors and citizens.
7) Cooperation and the importance of climate change and CO_2 emission.

What are identified as the main weaknesses of the Strategy?

1) Beach nourishment will have to be repeated due to ongoing erosion (proposed works to re-establish river sediment transport could reduce future erosion); budget uncertainties for follow-up work due to the economic crisis.
2) Check out the founds.
3) Costs of mitigation works.
4) Huge costs.
5) The research of funding and the involvement of all private and public actors of the community.
6) Check out funds.
7) Check out funds.

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) Not indicated
2) Not indicated

3) Not indicated
4) Not indicated
5) Not indicated
6) Not indicated
7) Not indicated

5.3.9 REFERENCES

1) https://climate-adapt.eea.europa.eu/metadata/case-studies/addressing-coastal-erosion-in-marche-region-italy/#websiteshttp://www.edubrovnik.org/upravni-odjel-za-zastitu-okolisa-i-prirode/dokumenti-zastite-okolisa/attachment/tekst-pzo-dnz-konacno-korigirano/
2) https://www.comune.ancona.gov.it/ankonline/urbanistica/wp-content/uploads/sites/14/2016/11/2013.02.21-DCC.27-SEAP-allegato.pdf
3) https://mycovenant.eumayors.eu/docs/seap/3915_1362513496.pdf
4) https://senigallia.openmunicipio.it/acts/deliberations/2019-05-29-000000-s-lp-2019-1048-patto-dei-sindaci-covenant-of-mayors-approvazione-del-piano-dazione-per-lenergia-sostenibile-ed-il-clima-del-comune-di-senigallia-secap-sustainableenergy-and-climate-action-plan/documents/
5) https://www.comune.fermo.it/it/3974
6) https://mycovenant.eumayors.eu/docs/seap/4427_1361528393.pdf
7) https://mycovenant.eumayors.eu/docs/seap/4426_1366714989.pdf

5.4 CENTRAL STRATEGIES: ŠIBENSKO-KNINSKA COUNTY

5.4.1 GENERAL INFORMATION

Name of the Strategy

1) Environmental protection Program of the City of Šibenik, for the period 2017 - 2020 (Šibenik Program 2017-2020)
2) Program for air protection, ozone layer protection, climate change mitigation and adaptation to climate change in Šibenik city area

Type of Strategy

	Adaptation	Mitigation
Šibenik Program 2017-2020		X
Protection program		X

Type of document that refer to the Strategy

1) Official document of the City of Šibenik
2) Program for the City of Šibenik

Agency that issued the Strategy

1) City of Šibenik
2) City of Šibenik

Year of issue

1) 2018
2) 2018

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) City of Šibenik
2) City of Šibenik

5.4.2 CONTEXT

General objectives of the Strategy

1) The purpose of this Program is to explore the state of the environment in the City, to analyse it and according conclusions, to define the goals for maintaining functional environmental systems and improvements environmental status of the City of Šibenik in accordance with the national environmental strategy; and national environmental action plan, respecting the specificities of urban space.
2) The program is a document that sets the goals and priorities for ozone protection layer and climate change mitigation. It is an integral part of the City's Environmental Program Šibenik, brought by the City Council of the City of Šibenik.

Description of the Strategy

1) The program consists of the following chapters: legal framework for development of the program, description of key stakeholders, description of 6 key economic sectors (legal framework, current situation and future goals), 8 key environmental components (legal framework, current situation and future goals), risk management and instruments for program implementation.
2) The purpose of the Program is to determine appropriate air protection goals defined through measures and priorities. Also, the measures are defined for ozone layer and climate change mitigation for four years by sector impact on the air (transport, industrial, general consumption and related subsectors). The measures are determined with the order, deadlines and holders or obligors of the implementation. Description of measures includes the estimated value of the investment.

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
Šibenik Program 2017-2020		X									
Protection program	X	X									Media

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…

- UN = United Nation Summits/Reports

5.4.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) Yes.
2) The document doesn't foresee future scenarios but includes specifics pilot area.

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) Yes
2) Yes

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) Not applicable
2) No

Does any scientific organization/institution participate in the Strategy? Which ones?

1) No
2) No

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) No
2) -

5.4.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
Šibenik Program 2017-2020	X	X					X	X			X	X	X		X	X	X	X	
Protection program			X				X				X	X				X	X		

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply

- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
Šibenik Program 2017-2020		X		
Protection program		X		

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other
Šibenik Program 2017-2020	X	X	X	
Protection program		X	X	

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Measures are defined descriptively, with named stakeholders, time schedule and possible financing sources.
2) -

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
Šibenik Program 2017-2020	X	X			
Protection program	X				

5.4.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Local, regional and national institutions are predefined as stakeholders in their domain of influence.
2) Local, regional and national institutions are predefined as stakeholders in their domain of influence.

What are their roles and responsibilities?

1) -
2) -

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
Šibenik Program 2017-2020		X	
Protection program		X	

5.4.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) No
2) -

5.4.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2017-2020
2) 2017-2020

State of the implementation

	Not started	In progress	Delayed	Completed	Other
Šibenik Program 2017-2020		X			
Protection program		X			

Reasons of deviations, if any

1) -
2) -

Funding

1) Project
2) EU funds, Budget of City of Šibenik, Fund for environmental protection and energy efficiency

Allocated budget [€]

1) -
2) -

5.4.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
Šibenik Program 2017-2020			X	
Protection program	X			

How are the outcomes of the Strategy evaluated?

1) -
2) -

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) City of Šibenik
2) City of Šibenik, Administrative department of spacious planning and protection environment

What are identified as the main strengths of the Strategy?

1) -
2) -

What are identified as the main weaknesses of the Strategy?

1) -
2) -

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) -
2) -

5.4.9 REFERENCES

1) https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&cad=rja&uact=8&ved=2ahUKEwjvhrvc_e3oAhXF4aYKHSTADSYQFjADegQICBAB&url=http%3A%2F%2Fwww.sibenik.hr%2Fpreuzmi
2) http://iszz.azo.hr/iskzl/datoteka?id=80836

5.5 SOUTHERN ADRIATIC: APULIA REGION

5.5.1 GENERAL INFORMATION

Name of the Strategy

1) Regional executive project POR 2000-2006 "Monitoring of coastal defense operations and the evolution of the coasts" of Brindisi
2) Municipal coasts plan of Rodi Garganico
3) Plan of Cycling Mobility of Foggia province
4) Life Master Adapt - MAinSTreaming Experiences at Regional and local level for adaptation to climate change
5) Municipal Emergency Plan of Brindisi for Civil Protection - Geo-hydrological risk
6) Regional executive project POR 2000-2006 "Monitoring of coastal defense operations and the evolution of the coasts" of Giovinazzo
7) Action Plan for Sustainable Energy (PAES)
8) Waste prevention and more recycling
9) Regional Nature Park Territorial Plan: "Coastal Dunes from Torre Canne to Torre San Leonardo"
10) River Contracts (Pilot project of the Royal Canal basin)
11) Urban Planning for Sustainable Mobility of Molfetta (PUMS)

Type of Strategy

	Adaptation	Mitigation
POR 2000-2006 Brindisi	X	
Rodi_Garganico	X	
Foggia province		X

Life Master Adapt City Union of northern Salento	X	
Emergency Plan of Brindisi		X
POR 2000-2006 Giovinazzo	X	
PAES Brindisi		X
Waste prevention Bari		X
Regional Nature Park	X	
River Contracts		X
PUMS Molfetta		X

Type of document that refer to the Strategy

1) European Directive 2001/42/CE (Strategic Environmental Evaluation), Decree with force of Law 152/2006, Regional Laws n.17/2006 and n. 44/2012.
2) European Directive 2001/42/CE (Strategic Environmental Evaluation), Law Decrees 152/2006, Regional Laws 44/2012 and 17/2015.
3) Regional Law 1/2013 and European Directive 2001/42/CE (Strategic Environmental Evaluation), CYRONMED and CIELO Projects, Plan of Services 2015-2017 and Regional Plan of Transport 2015-2019 (Actuative Plan).
4) Water Framework Directive (EU DQA) adopted in 2000 (Directive 2000/60 / EC) and the related "daughter" and "sister" directives (Directive 2006/118 / EC on Groundwater, Directive 2008/105 / EC on the standards of environmental quality in the field of water policies, Framework Directive 2008/56 / EC on the strategy for the marine environment and Directive 2007/60 / EC on flood risk management), which set precise tasks and deadlines at European level on the subject water protection and management and flood risk management.
5) European Directive 2007/60 / EC, Legislative Decree 49/2010, Legislative Decree 219/2010 - Deliberation of the Regional Council 7 March 2005, n. 255 concerning "GUIDELINES FOR THE PREPARATION OF PROVINCIAL AND MUNICIPAL EMERGENCY PLANS", Law n. 225/92 and Law n.100/2012, Regional Law n. 7 del 10/03/1994, "Procedures for alerting the

regional Civil Protection System for meteorological, geo-hydrological and hydraulic risk" approved with DGR 26 November 2013 n. 2181.

6) European Directive 2001/42/CE (Strategic Environmental Evaluation) and National Law 24/11/2000 n. 340 art. 22. and Regional Law n.17/2006
7) European Directives, Operative Programme of the Apulia Region (POR) 2014-2020 (Regional Decree n. 1498 of 17 July 2014).
8) Directive 2006/12/CE, European Directive 2001/42/CE (Strategic Environmental Evaluation), Law Decree 152/2006, Deliberation of the Regional Council 18 November 2008 n. 2197, Regional Regulation 22 December 2008 n. 28.
9) (Habitat Directive 92/43/CEE, 79/409/CEE, Act of address and coordination for the implementation in Apulia of the Regional Law No.19 /1997 and the Institutional Laws of Regional Protected Natural Areas. D. G. R. 3 August 2007, No. 1366.
10) Directive 2000/60/EC "Water", Directive 2007/60/EC "Floods", Directive 92/43/EEC "Habitat", Directive 2009/147/EC "Birds" Document "Definitions and basic quality requirements of the River Contracts", Legislative Decree 152/2006.
11) European Directive 2001/42/CE (Strategic Environmental Evaluation) and National Law 24/11/2000 n. 340 art. 22.

Agency that issued the Strategy

1) Municipality of Brindisi
2) Municipality of Rodi Garganico
3) Province of Foggia (Planning Office)
4) European Union
5) Civil Protection - operating unit; C.O.R.E.M. (Regional operational emergency committee)
6) Municipality of Giovinazzo
7) Municipality of Brindisi
8) Province of Bari
9) Apulia Region
10) Apulia Region
11) Municipality of Molfetta

Year of issue

1) 2017

2) 2019
3) 2013
4) 2016
5) 2018
6) 2014
7) 2012
8) 2009
9) 2013
10) 2019
11) 2016

Geographical area covered by the Strategy (e.g. Croatia, Marche Region...)

1) Municipality of Brindisi (Apulia region) with the following physiographic units: Port of Monopoli/Brindisi Punta Penne, Brindisi Punta Penne/Punta Riso, Brindisi Punta Riso/Torre Cavallo, Brindisi Torre Cavallo/Port of Otranto
2) Municipality of Rodi garganico (Apulia region)
3) Province of Foggia (Apulia region)
4) City Union of northern Salento (Campi Salentina, Squinzano, Surbo, Trepuzzi, Novoli, Salice Salentino, Guagnano) for Apulia region, among others
5) Municipality of Brindisi (Apulia region)
6) Municipality of Giovinazzo (Apulia region)
7) Brindisi municipality and Wide Area of Brindisi (18 municipalities)
8) Province of Bari
9) Municipality of Fasano and Ostuni (Apulia region)
10) Royal Canal (Brindisi, Apulia region)
11) Municipality of Molfetta (Apulia region)

5.5.2 CONTEXT

General objectives of the Strategy

1) Granting of the use of the coast and identification of a series of interventions that make this use environmentally sustainable, fair, accessible to the community.
2) The protection and enhancement of the rural territory, natural resources; contrast to land consumption; soil protection with reference to the hydraulic aspects and those of slope stability; the promotion of economic activities in respect of historical territorial components and morphological; upgrading and functional interconnection of the services and infrastructure network of supra-municipal level and of the mobility system.
3) Increasing the cycling mobility and reducing the effects of the traffic of cars, such as emission of polluting gases and energy consumption; sustaining new forms of tourism; spreading aware styles of life and a new culture of sustainable mobility and cycling.
4) LIFE MASTER ADAPT aims to support European local and regional authorities to react promptly to the negative impacts of climate change in the process of integrating adaptation into sectoral policies in order to protect territories, citizens and resources, through identification, verification and dissemination of multi-level governance tools.
5) Preserve the territory from geo-hydrological risk.
6) Protection and enhancement of areas of naturalistic and historical architectural interest; redevelopment of degrades areas; reorganization of the current system of state concessions with reference to the rules of the regional coastal plan; reorganization of the access system to the coast and promotion of forms of sustainable mobility; development of the tourism sector along the coast and inland in an environmentally friendly manner.
7) Reducing at least 20% of its greenhouse gas emissions, in particular CO_2, compared to 2007 through local policies and measures that increase the use of renewable energy sources, which improve energy efficiency and implement ad hoc energy saving programs and the rational use of energy.
8) Limit the production and danger of waste; favouring reuse and recycling, favouring the plant for the production of quality compost and CDR-Q; minimizing the start-up of disposal of residual fractions only in conditions of safety for the environment and health; identify any disposal basins and/or collection areas within the ATOs; ascertaining the needs, type and location of the plants to be built in the ATO, aiming at self-sufficiency at the provincial level; identify areas that are not suitable for the location of plants and areas suitable for the location of urban waste plants, with multiple indications for each type of plant, preferably in areas with existing treatment and / or disposal facilities; regulate the organization of the activities of separate collection of urban and similar waste in the ATOs and/or in the collection areas provided for by the Provincial Plan.
9) The overall objective of the Plan is to combine the conservation of nature and biodiversity with the enhancement and enjoyment of the territory and sustainable local development.
10) The protection, the correct management of water resources and the valorisation of river territories together with the safeguard from the hydraulic risk, contributing to local development.
11) Development of infrastructures according to environmental sustainability, improvement of infrastructures and public Transport services, addressing the mobility generated by urbanistic

changes mainly towards the public transport and sustainable mobility; enhancing interventions for road security, creation of pedestrian areas and Limited Traffic Zones (ZTL); promoting cycle lane and improving the stop in the city; promoting the logistic distribution of products in the urban areas; deleting the architectural barriers to improve accessibility in a city to everybody.

Description of the Strategy

1) Municipal Plan for the Coasts (PCC)
2) Municipal Plan for the Coasts (PCC)
3) Interventions to promote the development of cycling mobility
4) MASTER ADAPT wants to provide a common methodology supporting the Regions in identifying the main vulnerabilities and priorities for intervention and, in particular, to draw up guidelines for the government of adaptation in urban areas. The Metropolitan Areas and the aggregation of Municipalities will be the focus of the project: tools will be developed to facilitate the optimization of relations with higher level planning, to increase and coordinate the capacity for municipal planning and to facilitate public-private collaboration. This activity will be complemented by the mainstream process for the design and implementation of regional adaptation strategies through the coordination between the different levels of government of the territory (State, Regions and Local Authorities) and the horizontal coordination between the different policies (territorial, landscape, agricultural, environmental, civil protection). Thanks to the applied methodology and the tools that will be elaborated, the approach activated in MASTER ADAPT will have as its distinctive trait the high transferability and replicability in other areas, Regions and Local Authorities, in order to integrate processes of adaptation to climate change throughout Europe.
5) Monitoring and surveillance of the territory.
6) Municipal Plan for the coasts (PCC)
7) The interventions that the POR 2014-2020 identifies for the achievement of the general objective and which are incorporated in the present PAES are: reduction of energy consumption through energy efficiency measures in buildings, in public and public use structures and interventions to integrate renewable sources; reduction of energy consumption and emissions in companies and integration of renewable sources; increase in the share of energy requirements covered by distributed generation; increase in sustainable mobility in urban areas.
8) Provincial Plan of Waste Management of Bari
9) Promoting policies aimed at consolidating and developing forms of economic development that respect historical and environmental values.
10) The action to be taken to reach the definition of a River Contract starts from sharing and signing with the network of local actors involved of a Document of Intent, and then moving on to the

development of an appropriate cognitive analysis, the elaboration of a strategic document which define the scenario, to define an Action Program, to finally reach the subscription of an Act of formal commitment, the River Contract. The River Contract fixes the decisions shared in the participatory process and define the specific commitments of the contractors.

11) Urban Planning for Sustainable Mobility (PUMS)

Motivating factors of the Strategy

	Ext	EU	Eco	Sci	Med	NGO	Pri	Rec	Exa	UN	Other
POR 2000-2006 Brindisi	X	X		X			X				
Rodi_Garganico	X	X		X			X				
Foggia province		X									
Life Master Adapt City Union of northern Salento	X	X									
Emergency Plan of Brindisi	X		X								
POR 2000-2006 Giovinazzo	X	X		X			X				
PAES Brindisi	X	X					X	X	X		
Waste prevention Bari		X									
Regional Nature Park		X		X				X			
River Contracts	X	X									
PUMS Molfetta		X									

Legend:

- Ext = Extreme weather events/impacts
- EU = European policies
- Eco = Economic costs of inaction
- Sci = Scientific research
- Med = Media
- NGO = Non-Governmental Organization advocacy
- Pri = Private sector interests
- Rec = Recognizing opportunities
- Exa = Examples from other countries/regions…
- UN = United Nation Summits/Reports

5.5.3 RELEVANCE

Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science?

1) no
2) yes
3) no
4) yes
5) yes
6) yes
7) yes
8) yes
9) yes
10) Yes
11) yes

Are solid assessments of vulnerabilities / climate risks carried out to support the decision-making process?

1) no
2) yes
3) no
4) yes
5) yes
6) yes
7) yes
8) yes
9) yes
10) Yes
11) yes

Does the Strategy explicitly take transboundary risks (i.e. risks that cross administrative boundaries) into account, when relevant?

1) no
2) no
3) no
4) no
5) no
6) no
7) no
8) no
9) no
10) No
11) no

Does any scientific organization/institution participate in the Strategy? Which ones?

1) University

2) no
3) no
4) Universities of Sassari and Venice (IUAV), Superior Institute for Protection and Environmental Research and other research Institutions.
5) no
6) no
7) no
8) no
9) no
10) Polytechnic of Bari
11) no

Do any bridging organizations/institutions between science and policy participate in the Strategy? Which ones?

1) Municipality of Brindisi, private and public Technicians, WWF Italy, Italia Nostra, Legambiente, Citizens, Labor Unions.
2) Universities, public and private research Institutions.
3) No.
4) Ambiente Italia s.r.l., Fondazione Lombardia per l'Ambiente.
5) No.
6) National Association for Environmental Protection, Ministry if Cultural Heritage and Activities and Tourism (MIBAC), Apulia Region, ARPA Apulia (Apulia Regional Agency for Environmental Protection), Basin Authority of Apulia Region, Province of Bari.
7) No.
8) No.
9) No.
10) Water Authority of Apulia region, Arneo Reclamation Consortium, Torre Guaceto Management Consortium, Brindisi Confindustria, Association "The island that does not exist" of Latiano (BR), Order of Geologists of Apulia Region, Italian Society of Environmental Geology, GAL northern Salento, Italian Federation of Friends on Bicycle, Order of Architects of the Province of Brindisi, District Authority of the southern Apennines, Strategic Agency for the Sustainable Development of the Territory.
11) No.

5.5.4 IMPLEMENTATION

Vulnerable sectors and topics involved in the Strategy

	Agr	Bio	Coa	Com	Des	Eme	Ele	Fis	Flo	For	Hum	Ind	Lan	Res	Tou	Tra	Urb	Wat	Other
POR 2000-2006 Brindisi			X	X					X						X	X			
Rodi Garganico			X	X					X				X		X	X			
Foggia province			X								X				X	X	X		
Life Master Adapt City Union of northern Salento		X							X				X					X	
Emergency Plan of Brindisi	X	X				X					X		X	X		X			
POR 2000-2006 Giovinazzo			X	X					X						X	X			
PAES Brindisi	X	X					X				X	X			X	X			

Waste prevention Bari		X		X							X		X		X			X	
Regional Nature Park	X	X	X	X	X		X				X		X		X	X	X		
River Contracts		X							X				X					X	
PUMS Molfetta				X							X					X	X		

Legend:

- Agr=Agriculture
- Bio=Biodiversity/Ecosystem conservation
- Coa=Coastal management
- Com=Communications
- Des=Desertification and drought
- Eme=Emergency and rescue services
- Ele=Electricity supply
- Fis=Fishery
- Flo=Floods and landslides
- For=Foreign policy
- Hum=Human health
- Ind=Industry
- Land=Land use
- Res=Responsibility and Insurance
- Tou=Tourism and leisure
- Tra=Transport and Infrastructure
- Urb=Urban settlement
- Wat=Water resource management

Time span of the Strategy (from the beginning to the end of the implementation)

	Short-term (up to 1 year)	Middle-term (1-5 years)	Long-term (over 5 years)	Other
POR 2000-2006 Brindisi			X	
Rodi_Garganico			X	
Foggia province			X	
Life Master Adapt City Union of northern Salento		X		
Emergency Plan of Brindisi			X	
POR 2000-2006 Giovinazzo			X	
PAES Brindisi			X	
Waste prevention Bari			X	
Regional Nature Park			X	
River Contracts			X	
PUMS Molfetta			X	

Type of envisioned measures

	"Gray" measures	"Green" measures	"Soft" measures	Other

POR 2000-2006 Brindisi	X	X		
Rodi_Garganico	X			
Foggia province	X			
Life Master Adapt City Union of northern Salento			X	
Emergency Plan of Brindisi			X	
POR 2000-2006 Giovinazzo	X			
PAES Brindisi	X			
Waste prevention Bari	X		X	
Regional Nature Park	X	X		
River Contracts			X	
PUMS Molfetta	X			

Legend:

- "Gray" measures= based on engineering solutions (eg infrastructure construction)
- "Green" measures = based on the improvement of ecosystem services (eg tree planting)
- "Soft" (non-structural) measures = focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)

Description of the envisioned measures

1) Objectives intrinsic to the PCC: recovery and reuse of dark water in the facilities of the establishments; controlled savings with flow reducers and water timers for bathing services; dissemination of information for tourists aimed at saving the environmental resources of the landscape/environment; use of non-polluting energy sources (introduction of solar panels) and landscape non-impacting; waste separate collection on the beaches. Objectives coordinated with other instruments: rationalization of roads and parking lots; use of soft mobility; adoption of management plan measures in coastal protected areas. Coastal recovery objectives: re-establishment of beaches, also through artificial beach nourishment; re-naturalization of the coastal strip with interventions for the protection, conservation and evolution of the coastal garrigue and the scrubland and to favour the reconstitution of cords and stretches of coastal dunes; recharge and reorganization of existing defence works; restoration of coastal structures and increase in naturalness. Objectives of physical requalification: construction of soft barriers parallel to the coastline.
2) Interventions on the crag, interventions at sea (brushes and repairs), increase in interventions of natural engineering; environmental maintenance; restricting/adjusting access in areas of greater vegetative importance.
3) Fitting the existing infrastructures to the context of urban centre; addressing the location of new infrastructures towards areas with more environmental adaptability; fitting the new infrastructures to those existing in order to reduce the consumption of soil and contain the territorial fragmentation; sustaining the adoption of alternative forms of mobility; reducing the levels of traffic; promoting the use of public transport; increasing the role of railroad.
4) PREPARATORY ACTIONS: at the beginning of the project, LIFE MASTER ADAPT will work on a first assessment of the current situation, with the following activities:
    - climate analysis and regional vulnerability assessment, to identify impacts, risks and vulnerabilities for key sectors and provide indicators and guidelines for climate analysis and vulnerability assessment at regional and local level.
    - Evaluation of mainstreaming processes in selected climate change adaptation practices across the EU to create a European network and capitalize on experiences.
    - IMPLEMENTATION MEASURES: these actions are the heart of the project and will be developed in:
    - selection of adaptation objectives at regional and sub-regional level, according to a vertical and horizontal mainstreaming process.
    - development of effective methods for integration and multilevel governance in defining regional adaptation strategies.
    - integration of the adaptation strategy and measures at the intermediate administrative level: groups of municipalities and metropolitan cities.
    - replicability and transferability of the project results to other regions (in Italy and Austria) and Municipalities.
    - IMPACT MONITORING: this action aims to monitor and measure the effectiveness of MASTER ADAPT actions with respect to the initial situation in the target areas (Lombardy

and Sardinia, aggregation of Municipalities and Metropolitan Cities). Planned activities are the monitoring and measurement of specific indicators for LIFE Projects and other relevant indicators that can provide useful information on the impact of MASTER ADAPT.

- COMMUNICATION AND DIFFUSION ACTIONS: strong communication and networking activities will be developed and implemented during the MASTER ADAPT period and subsequently: further information on communication and Networking can be found in the respective sections on the site.

5) Knowledge of the various levels of geo-hydrological risk and various methods of intervention with the roles and operational tasks of civil protection structures.
6) Enhance the archaeological area of Pozzo Pato and the Lama Castle; recover the stretches of coast that are in a state of degradation; Indicate the distribution, consistency and location of the lots that can be granted for tourist-recreational activities; Dictate the transitional rules aimed at regulating the modalities of adaptation of the status of the previous places to planning; Indicate the building types, the characteristics of the materials and the colours for the buildings, the shading structures and walkways; Regulate the transformation of existing fixed works into any easily removable works; Discipline any type of construction activity and/or urban transformation, even modest, achievable on State property by the concessionaire; Promote the creation of eco-compatible structures in order to pursue sustainable development of the tourism; Provide for the laying of greenery, also of shrubby nature, as well as in the FP3 range, also in FP2, mainly in the immediate interior of the "services area"; Discipline the placing of advertising signs and/or artefacts, without jeopardizing the free view of the sea; Indicate the possible location of piers, mooring points and/or tourist landing places; Define a system of accesses that allows free use of all the stretches of the Giovinazzo coast; Identify forms of accessibility and use of the coast both pedestrian and cycle, also in connection with the cycling networks of the Bicitalia national network.
7) In order to achieve the objective of reducing CO2 emissions, the Municipality of Brindisi intends to implement actions aimed at achieving the following specific objectives: rationalization of energy consumption of public and private buildings; use of renewable energy sources for the production of electricity; rationalization of energy consumption related to public lighting; promotion of sustainable mobility, in particular through the creation of cycle paths and the activation of other projects aimed at reducing traffic and the use of private cars, with a consequent reduction in the share of energy due to transport; increase in the use of renewable natural resources, mainly to replace fossil fuels, for the production of thermal energy; raising the awareness of all public and private subjects acting on the territory with respect to issues of energy sustainability; sharing their experience and knowledge with the other municipalities of the Brindisi area and with the other signatories of the Covenant of Mayors. In particular, the PAES identifies actions consistent with the provisions of the aforementioned Urban Mobility Plan in the following areas: promotion of new public mobility systems; interventions for the development of soft mobility; bike sharing policies.
8) Actions concerning environmental communication; actions aimed at reducing waste production; actions to support recovery; monitoring of the implementation of the Plan and promotion of improving the performance of the waste management system.

9) Reconstruction of the dune system with naturalistic engineering techniques, naturalisation of currently degraded areas, naturalisation of currently farmed areas with priority habitats or community interest recovery of degraded areas, safeguarding and recovery of the pond and lock system, naturalistic recovery of the currently cemented canals.
10) Protection and enhancement of the territories concerned, for the purposes of environmental and landscape redevelopment of the Royal Canal and the habitats present along the route from the sources to its mouth.
11) Developing infrastructures according to environmental sustainability, improving infrastructures and public Transport services; creating pedestrian areas and Limited Traffic Zones (ZTL); promoting cycle lane.

Policy instruments envisaged to implement the Strategy

	Regulatory	Economic/Financial	Voluntary	Communication-related	Other
POR 2000-2006 Brindisi		X		X	
Rodi Garganico		X		X	
Foggia province		X		X	
Life Master Adapt City Union of northern Salento				X	Multi-level governance instruments
Emergency Plan of Brindisi			X	X	

POR 2000-2006 Giovinazzo		X		X	
PAES Brindisi		X		X	
Waste prevention Bari		X		X	
Regional Nature Park		X		X	
River Contracts		X	X		
PUMS Molfetta		X		X	

5.5.5 INTERACTIONS

Which public and private stakeholders (e.g. agencies, institutions, citizens) are involved in the development and implementation of the Strategy?

1) Apulia Region, Basin Authority of Apulia Region, ARPA Apulia (Apulia Regional Agency for Environmental Protection), A.Re.S. Apulia (Regional Sanitary Agency of Apulia), AQP (Acquedotto of Apulia), Province of Bari and Brindisi, Cultural and Environmental Associations), A.T.O. Apulia (Hydric Integrated Service), Authority of Port (Brindisi and Bari), ASI Consortium,

Regional Direction for Cultural and Landscape Heritages, Railroads of State, ANAS S.p.A., SNAM Network Gas, TERNA S.p.A. (National Electrical Network), boundary Communes, Labour Unions.

2) ISTAT (National Institute of Statistics), ISPRA (Superior Institute for Protection and Environmental Research), MATTM (Ministry of the Environment and Land and Sea Protection), State Forestry Corps, ARPA Apulia (Apulia Regional Agency for Environmental Protection), Apulia Region, ANAS (National Autonomous Road Company), Terna, APT (Tourist Promotion Company) of the province of Foggia, Province of Foggia; Universities, public and private Research Institutions.
3) Municipalities and Province of Foggia, private and public Technicians, Citizens.
4) Universities and other research Institutions, Public Administrations such as Autonomous Region of Sardinia, Metropolitan Area of Cagliari, Sassari City, Aggregation of Cities at North of Milan, Metropolitan City of Venice, Union of Cities of northern Salento, Lombardia Region, private Organizations, Citizens.
5) Municipality of Brindisi, fire fighters, municipal police, health service, citizens.
6) Municipality of Giovinazzo, private and public Technicians, WWF Italy, Italia Nostra, Legambiente; National Association of Animal, Nature and Environment Protection; National Association for environmental protection; F.A.I. (Found for Italian Environment); Citizens, labor unions.
7) The Administrations of 19 Municipalities involved into Wide Area of Brindisi and Economic and Environmental Commissions of the Municipality of Brindisi; citizens and tourists.
8) Municipalities and Province of Bari, Apulia Region, Provincial Agencies (ATO), ARPA Apulia, Citizens.
9) Municipality of Fasano, private and public Technicians, Citizens.
10) Water Authority of Apulia region, Arneo Reclamation Consortium, Torre Guaceto Management Consortium, Brindisi Confindustria, Association "The island that does not exist" of Latiano (BR), Order of Geologists of Apulia region, Italian Society of Environmental Geology, GAL northern Salento, Italian Federation of Friends on Bicycle, Order of Architects of the Province of Brindisi, District Authority of the southern Apennines, Strategic Agency for the Sustainable Development of the Territory, Apulia Region, Province of Brindisi, Municipality of of Brindisi, Municipality of Francavilla Fontana, Municipality of Latiano, Municipality of Mesagne, Municipality of Oria, Municipality of San Vito dei Normanni, Municipality of Villa Castelli, Polytechnic of Bari.
11) Municipality of Molfetta, private and public Technicians, Citizens.

What are their roles and responsibilities?

1) Professional roles and responsibilities for the Technicians, both public and private; public relationship between Public Institution and Citizens.
2) Professional roles and responsibilities for the Technicians, both public (Civil Protection Regional Service, Authority of Apulia Basin) and private; public relationship between public Institution and Citizens.
3) Professional roles and responsibilities for the Technicians, both public and private; knowledge for the Citizens.
4) Technical "soft" roles and responsibilities and knowledge for the Citizens.
5) Coordination for the protection of the territory and human health.
6) Professional roles and responsibilities for the Technicians, both public and private; public relationship between public Institution and Citizens.
7) Professional roles and responsibilities for the Technicians, both public and private; public relationship between public Institution and Citizens.
8) Professional roles and responsibilities for the Technicians, both public and private; public relationship between public Institution and Citizens.
9) Professional roles and responsibilities for the Technicians, both public and private; knowledge for the Citizens.
10) Professional roles and responsibilities for the Technicians, both public and private; knowledge for the Citizens.
11) Professional roles and responsibilities for the Technicians, both public and private; knowledge for the Citizens.

What kind of communication flow is prevalent?

	Top-down approach	Bottom-up approach	Other
POR 2000-2006 Brindisi	X		
Rodi_Garganico	X		
Foggia province	X		
Life Master Adapt City Union of northern Salento	X		

Emergency Plan of Brindisi	X		
POR 2000-2006 Giovinazzo	X		
PAES Brindisi	X		
Waste prevention Bari	X		
Regional Nature Park	X		
River Contracts		X	
PUMS Molfetta	X		

5.5.6 COHERENCE

Is the Strategy integrated into new or existing sector policies? Which ones?

1) Regional Plan for the Coasts (2006)
2) Regional Plan for the Coasts (2006)
3) CYRONMED and CIELO Projects, Territorial Plan of Provincial Coordination (PTCP)
4) Don't know
5) Yes, it is integrated in existing sector policies; One of these is public safety policy
6) Regional Plan for the coasts (2006)
7) The PAES fits into a wider context of policy implementation, consistent with community and regional planning, aimed at improving the quality of life of citizens through the support of sustainable development at the local level
8) Regional Plan of Waste Management
9) Regional Law n.31/2006; Regional Law n.19/97; National Law n.394/91
10) National Charter of River Contracts
11) Action Plan for Urban Mobility (2009) and White Book about Transport (2011)

5.5.7 EFFICIENCY

Foreseen initial-end dates of implementation

1) 2017-2020
2) start 2019
3) 2014-2020
4) 2016 - 2019
5) 2018 until the next update
6) 2014-2020
7) 2014-2020
8) 2009 - 2020
9) 2013
10) Don't know
11) 2016 VAS – 2018 monitoring

State of the implementation

	Not started	In progress	Delayed	Completed	Other
POR 2000-2006 Brindisi		X			
Rodi_Garganico		X			
Foggia province		X			
Life Master Adapt City Union of northern Salento		X			
Emergency Plan of Brindisi		X			
POR 2000-2006 Giovinazzo		X			

PAES Brindisi		X			
Waste prevention Bari				X	
Regional Nature Park		X			
River Contracts	X				
PUMS Molfetta		X			

Reasons of deviations, if any

1) None
2) None
3) None
4) None
5) None
6) None
7) None
8) None
9) None
10) None
11) None

Funding

1) POR 2000-2006 "Monitoring of coastal defense operations and the evolution of the coasts"
2) Public Funding
3) FESR, FSC, PAC funds
4) LIFE+
5) no
6) POR 2000-2006 "Monitoring of coastal defense operations and the evolution of the coasts"

7) Horizon 2020, LIFE 2014-2015, European Energy Efficiency Fund funding programs; national and regional calls; revolving funds, leasing, third party financing, ESCo, internal resources.
8) -
9) European Agricultural Fund for Rural Development (EAFRD), leading fund
10) Based on the action program
11) Operative Programme PO FESR 2014-2020

Allocated budget [€]

1) Based on each executive project, step by step
2) Based on each private or public work, step by step
3) Based on each executive project, step by step
4) € 1.592.674 in total, for all involved stakeholders
5) Don't know
6) Based on each executive project, step by step
7) Based on each project, step by step.
8) -
9) Based on each executive project, step by step
10) Based on each executive project, step by step
11) Based on each executive project, step by step

5.5.8 ACHIEVED RESULTS

Are the outcomes of the Strategy evaluated?

	Yes	No	Don't know	Other
POR 2000-2006 Brindisi	X			
Rodi_Garganico	X			
Foggia province	X			

Life Master Adapt City Union of northern Salento	X			
Emergency Plan of Brindisi	X			
POR 2000-2006 Giovinazzo	X			
PAES Brindisi	X			
Waste prevention Bari	X			
Regional Nature Park	X			
River Contracts	X			
PUMS Molfetta	X			

How are the outcomes of the Strategy evaluated?

1) Monitoring
2) The outcomes are evaluated through scenarios.
3) Monitoring
4) Monitoring
5) Monitoring and territorial protection
6) Monitoring
7) Monitoring and Greenhouse gas emissions base inventory (EIB)
8) Monitoring
9) Monitoring
10) Monitoring
11) Monitoring and questionnaire

Has been set up a body in charge of the monitoring and review of the Strategy? Which one?

1) ARPA Apulia (Apulia Regional Agency for Environmental Protection).
2) ARPA Apulia (Apulia Regional Agency for Environmental Protection), Apulia Region, ANAS (National Autonomous Road Company), APT (Tourist Promotion Company) of the province of Foggia, Province of Foggia; Universities, public and private Research Institutions.
3) Municipalities and Province of Foggia.
4) Sardinia Region.
5) Civil Protection - C.O.R.E.M. (Regional operational emergency committee).
6) ARPA Apulia (Apulia Regional Agency for Environmental Protection).
7) Municipality of Brindisi together with 18 Municipalities of Wide Area of Brindisi.
8) Municipality of Altamura, Consortium "Managing Authority of the Optimal Territorial Area – BA/4", Authority of the Basin of Apulia, Alta Murgia Park, ARPA Apulia, Municipality of Mola di Bari.
9) Apulia Region District.
10) Not currently.
11) Apulia Region District.

What are identified as the main strengths of the Strategy?

1) -
2) The strategies would quantitatively and qualitatively regulate the area that could be used for concessions, free use and free use accompanied by the presence of services, as well as increasing accessibility. The actions are aimed, on the one hand, at creating environmentally oriented services and, on the other, at protecting parts of the environment.
3) Creating a system of sustainable transport, increasing the number of cyclists.
4) Mainstream processing for the design and implementation of regional adaptation strategies through the coordination between the different levels of government of the territory (State, Regions and Local Authorities) and the "horizontal" coordination between the different policies (territorial, landscape, agricultural, environmental, of civil protection).
5) Create a system of safeguarding the territory and human health.
6) -
7) Integrate regional planning policies.
8) Space-time coordination between the producer of differentiated waste and employees in storage centres.
9) Growth of rural tourism, cultural tourism, sports tourism.
10) -
11) -

What are identified as the main weaknesses of the Strategy?

1) State areas in which the issue, renewal and variation of pre-existing concessions is absolutely prohibited; areas currently intended for bathing establishments but in contrast with regulatory provisions.
2) -
3) Organizational difficulties.
4) -
5) Timing of information transmission.
6) -
7) -
8) To inform and train citizens to differentiate wastes.
9) Lack of appropriate technologies.
10) -
11) Lack of appropriate technologies.

What is the main lesson learned, namely the emerging necessities and opportunities, coming from the Strategy?

1) Safeguarding the coastline by erosion and pollution; development of existing tourism.
2) Safeguarding and enhancing coast and tourism.
3) Improve the quality of the urban environment, reducing pollution, emission of greenhouse gases and increasing security of the Citizens and efficiency of the roads.
4) High transferability and replicability in other areas, Regions and Local Authorities, in order to integrate processes of adaptation to climate change throughout Europe.
5) Efficient coordination in alert and emergency operations.
6) -
7) The municipalities involved have implemented the concept of sustainability both from an environmental and an energy point of view.
8) The Plan and the implementation of the actions prudently provided for a containment of growth rather than a reduction in production.
9) Improve the quality of the urban environment, naturalistic and landscape values.
10) Valuing river territories.
11) -

5.5.9 REFERENCES

1) https://www.comune.brindisi.it/zf/index.php/atti-amministrativi/delibere/dettaglio/atto/G1mpRMETRPT0-A
2) http://www.sit.Apulia.it/ecologia-web/download?ref=3023&doc=VAS
3) http://territorio.provincia.foggia.it/PMCP_Schema
4) https://masteradapt.eu/
5) https://www.comune.brindisi.it/brindisi/images/protezione_civile/RelazioneRischio_IDROGEOLOGICO_AGG1_1_.pdf
6) http://www.sit.Apulia.it/ecologia-web/download?ref=1367&doc=VAS
7) https://mycovenant.eumayors.eu/docs/seap/16456_1430238676.pdf
8) https://www.cittametropolitana.ba.it/home_page/struttura_e_organizzazione/00001575_PPGR__Piano_Provinciale_Gestione_Rifiuti.html
9) http://www.sit.Apulia.it/ecologia-web/download?ref=913&doc=VAS
10) http://www.regione.Apulia.it/documents/10192/45998558/DEL_1788_2019.pdf/d7e9f669-0721-495a-a3d4-a23bf6fd019c
11) http://www.sit.Apulia.it/ecologia-web/download?ref=1715&doc=VAS

5.6 SOUTHERN ADRIATIC: DUBROVACKO-NERETVANSKA COUNTY

No strategy about mitigation or adaptation to climate change was reported in the Dubrovačko-Neretvanska County.

6 DISCUSSION

6.1 EUROPEAN STRATEGIES

Responding to the UN summit, the European Commission realized two different Strategies based on climate scenarios: one for the adaptation (2013) to climate change and one for the mitigation (2005) to reduce greenhouse gas emissions. The focus of the first Strategy is a resilient Europe, implementing a guideline and the establishment of the Covenant of Mayors, while the goal of the second, aims to set percentage values to be achieved for the reduction of the emission of greenhouse gases (GHG), 20% by 2020 and 40% by 2030, like CO_2, N_2O, PFC and heavy fines.
In the adaptation Strategy, the Commission plans to address the knowledge gaps on adaptation and to develop the European Climate Adaptation Platform (Climate-ADAPT) as a "*one-stop shop*" for information on adaptation in Europe. In the mitigation Strategy, companies receive or purchase allowances that they can trade if they wish; each indemnity gives the holder the right to emit one ton of CO_2 or the equivalent amount of two other powerful greenhouse gases, N_2O and PFC.
Both the Strategies involve vulnerable sectors and topics like industry and responsibility and insurance, and the time span is long-term (over 5 years). The adaptation Strategy involved also the primary sector like agriculture and fishery and the tertiary sector; while the mitigation Strategy given implied also the transport and infrastructure.
The envisioned measures are “green” and “soft” for both Strategies, and “gray” for the adaptation. Policy instruments envisaged to implement the Strategy are economic/financial instruments for both Strategies, and voluntary and communication-related for the adaptation ones.
The top-down communication is prevalent for the two Strategies, but the adaptation ones use also the bottom-up communication. Their implementation is in progress, the funds are European and at the end they will be evaluated with public consultation and by the EU Commission and by the Union Registry.
The main strong points are the collaboration and the decrease of polluting gases in order to reduce costs and carbon price, but there are weaknesses, like the slower progress for local communities and the carbon leakage.

6.2 NATIONAL STRATEGIES

The 28 European Countries have to adopt the EU adaptation Strategy and at the same time they have to settle the EU mitigation Strategy also like Iceland, Liechtenstein and Norway. They use the guidelines and fit the Strategy to the natural and social characteristics of their territories.
The Strategies of the Countries analysed refer to the EU policies and because of this, they are based on climate change and vulnerable and climate risk sectors. The Strategies take transboundary and non-transboundary risks, and the help of scientific and bringing organization are prevalent. The vulnerable sectors and topics involved are agriculture, biodiversity/ecosystem conservation, fishery, and land use in many cases, and industry and land use are considered too. Often, long-term time span characterizes the measures, like also the regulatory and communication-related policy instruments envisaged to implement the Strategy. The type of envisioned measures is different between the different Countries, but the approach is predominantly top-down type. The outcomes are always evaluated by monitoring and with indicators, and the Strategies are in progress.

The specific characteristics of the two states analysed are illustrated below.

6.2.1 ITALY

The Italian ministries adopt the European Strategy to implement a specific Strategy for the Italian territory. One adaptation Strategy and two mitigation Strategies are based on climate changes and vulnerable and climate risks assessment and refer to the EU policies. The goal of the adaptation Strategy is an adapting framework for each intersectoral aspect to the consequence of climate changes. One mitigation Strategy focuses on supporting national, regional and local institutions to limit vulnerability, to improve opportunities and to facilitate the coordination; the other ones is realized to achieve the European goal to reduce greenhouse gas emissions spreading renewable and energy efficiency. The mitigation Strategies take transboundary risks and all the Strategies involve the vulnerable sectors and topics of agriculture, human health, industry and transport. The National Adaptation Strategy (NAS) and the National Plan for Adaptation to Climate Change (NPACC) concern the vulnerable sectors of biodiversity, coastal management, desertification and drought, electricity supply, fishery, floods and landslides, responsibility and insurance, tourism and leisure, urban settlement, water resource management. The National Plan for Adaptation to Climate Change (NPACC) implicates the communication, emergency and rescue services and foreign policy. The two mitigation Strategies involve the land

use. Therefore, the Italian Strategies draw in all the vulnerable sectors and topics, that is possible to identify.
All the Italian actions have a long-term (over 5 years) time span and all of the Strategy envision “gray” measures; the NAS and the NPACC contemplate also “green” and “soft” measures. The NAS measures are divided into two types: one is a planning by 2020 and one defines climate change index and measures beyond 2020; the NPACC settles the information Strategy, the implementation of financial instruments and the infrastructure planning; the NIPEC suggests renewable and innovative technologies and the application of environmental assessment procedures.
The policy instruments envisaged to implement the Strategies are communication-related for all the Strategies and regulatory for the NPACC and the NIPEC.
The top-down approach is a common kind of communication for the Italian Strategies, but the NAS provides a part of bottom-up communication.
The Strategies are integrated into new or existing sector policies and the NAS is completed, the NPACC is in progress and the NIPEC is not approved by EU yet.
Funds are provided by the EU and the outcome of the Strategies are evaluated with monitoring.
The main strength of the NAS is the realization of a strategic document and for the NPACC Strategy the efficacy point is the common guideline that is free consulting. The poor coordination of the authorities is considered as the main weakness of the NPACC.

6.2.2 CROATIA

In 2019, the Croatian Ministry of Environment and Energy and the Croatian Government realized two Strategies based on climate changes: Climate Adaptation Strategy in the Republic of Croatia for the period to 2040, with a look at 2070 and Low Carbon Development Strategy of the Republic of Croatia –white book for public consultations. Respectively, they are an adaptation and mitigation Strategy. The first one is a plan to make Croatia more resilient to climate changes preparing economy and society to the climate changes defining measures and implementation plans. The second strategy has the general objectives of creating a competitive economy by reducing carbon emissions and air pollution, increasing resource efficiency; this is possible, by specifying the emission targets for the periods: 2020 and 2030 and 2050. Funding source, environmental, social and impact on economy from predicted scenarios are considered in the mitigation Strategy. The motivating factors for the two Strategies are EU policies, Scientific research, Examples from other countries/regions and UN Summits/Reports. The extreme weather conditions characterized the mitigation Strategy.

There are solid assessments of vulnerabilities and climatic risks conducted to support the decision-making process: the adaptation strategy is the result of an integral approach which, starting from the analysis of the situation in selected sectors and cross-sectoral thematic areas, determines-sectoral impacts and vulnerabilities as well as aggregate measures, considering the possibilities of implementing the plan and the cross-sectoral impacts of the implemented measure. In the mitigation Strategy, the documents provide climate risk analysis and climate change effect on economy, society and environment.
Both the Strategies do not consider transboundary risks and involve scientific and bringing organizations.
The vulnerable sectors and topics involved in the Strategies are agriculture, fishery, tourism, urban settlement and water resources. The adaptation Strategy considers also biodiversity/ecosystem conservation and human health; instead of the mitigation Strategy that consults electricity supply, industry, land use and transport and infrastructure sectors too.
The time span is a long-term type, but the mitigation Strategy considers a short-term because the measures are divided into periods of time (2020, 2030, 2050).
“Gray”, “green” and “soft” measures are foreseen, such as planning and infrastructural measures for the first strategy and cards with planning, investments, expected results and communication for the second strategy.
The policy instruments envisaged to implement the Strategy is regulatory and economic/financial for both Strategies, and it is communication-related for the mitigation one. Top-down communication flow is prevalent, and the Strategies are integrated into new or existing sector policies.
The adaptation Strategy is projected until 2070, while the mitigation Strategy plans measures until 2050. The state of the implementation is not started yet; the funds are European, and the outcomes are evaluated with the analysis of indicators for both the Strategies and with monitoring in the specific case of the adaptation Strategy.
The adaptation Strategy recognizes like a strength the targets technically and financially identified and evaluated; and the main lesson learned is that immediate actions of all relevant stakeholders are mandatory in efforts to prepare the society to forthcoming climate change. The mitigation Strategy considers the problem of the “carbon leakage”, which refers to the situation that may occur if, for reasons of costs related to climate policies, businesses transfer production to other Countries which have laxer constraints on greenhouse gas emissions, because this could lead to an increase in their total emissions.

6.3 REGIONAL STRATEGIES

The regional Strategies mirror European and national indications. They refer to weather conditions, EU policy and are based on climate changes; assessments of vulnerabilities and climate risks are carried out by all the Strategies and transboundary risks are often taken. The vulnerable sectors involved have different importance into every Strategies, like it is possible to observe in Figure 4. The vulnerable sectors have been analysed through the northern, central and southern regional Strategies and it has been obtained a graphic for each area that indicates the proportion between the vulnerable sectors. All have a long-term time span and often the policy instruments are regulatory and communication related. The approach is top-down type; often the Strategies are integrated into new or existing policies and the outcome are always evaluated by monitoring.
The analysis and the objectives are different, but the cooperation and the presence of a guideline is very important for all.

In the following paragraphs the characteristics of the Strategies divided into north, central and south will be illustrated.

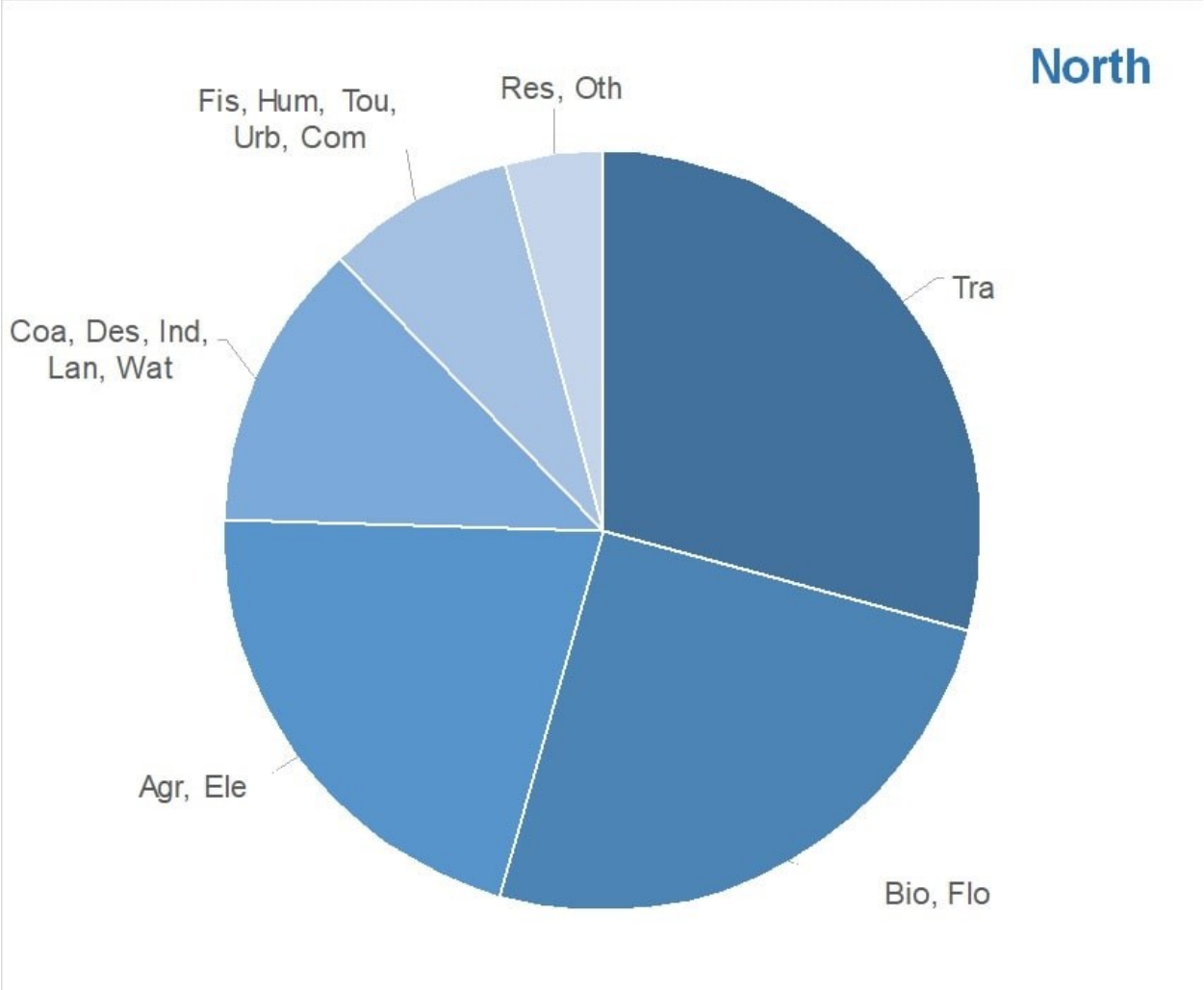

Figure 4a. - Pie chart of the Northern Regional vulnerable sectors.

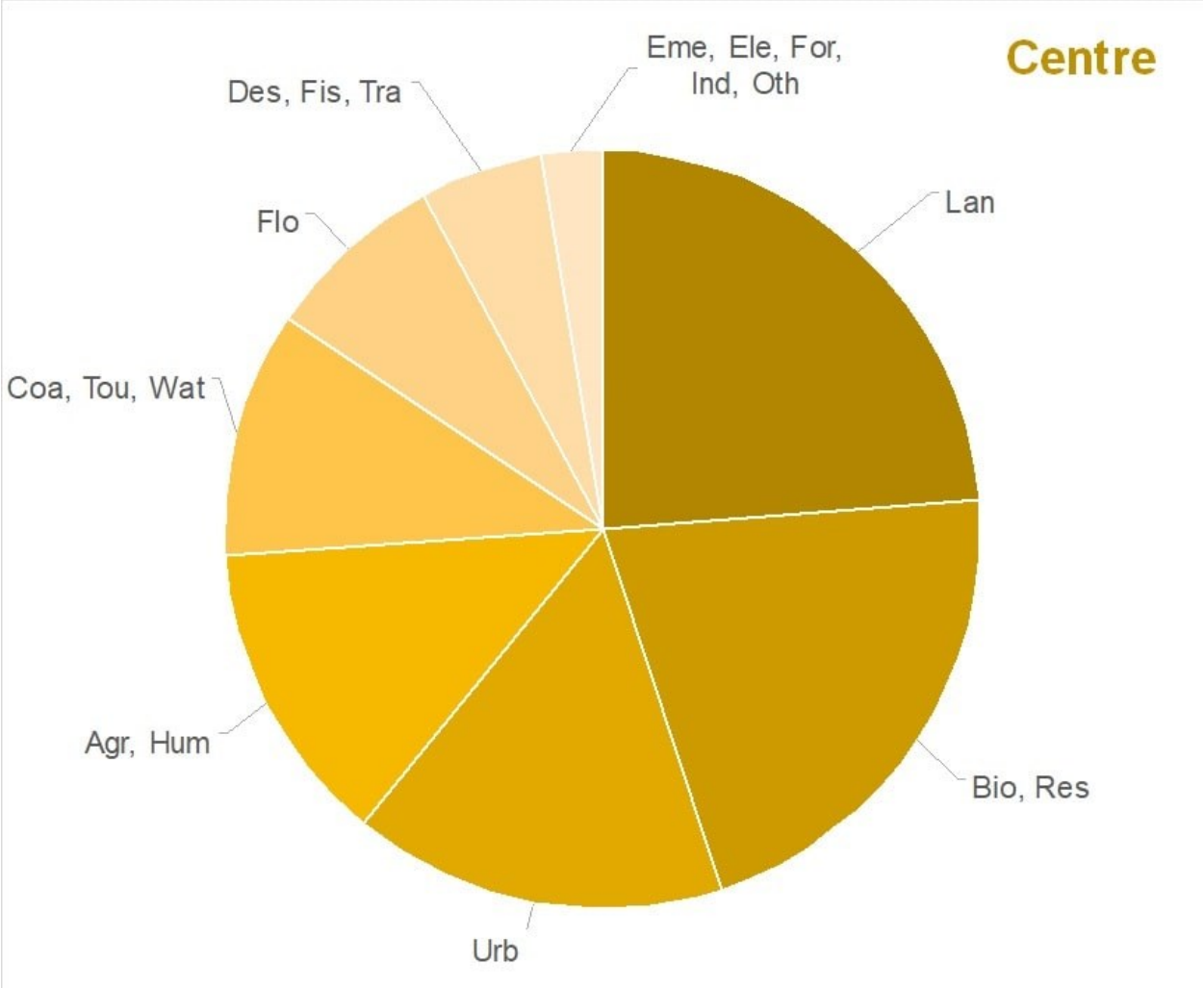

Figure 4b. - Pie chart of the Central Regional vulnerable sectors.

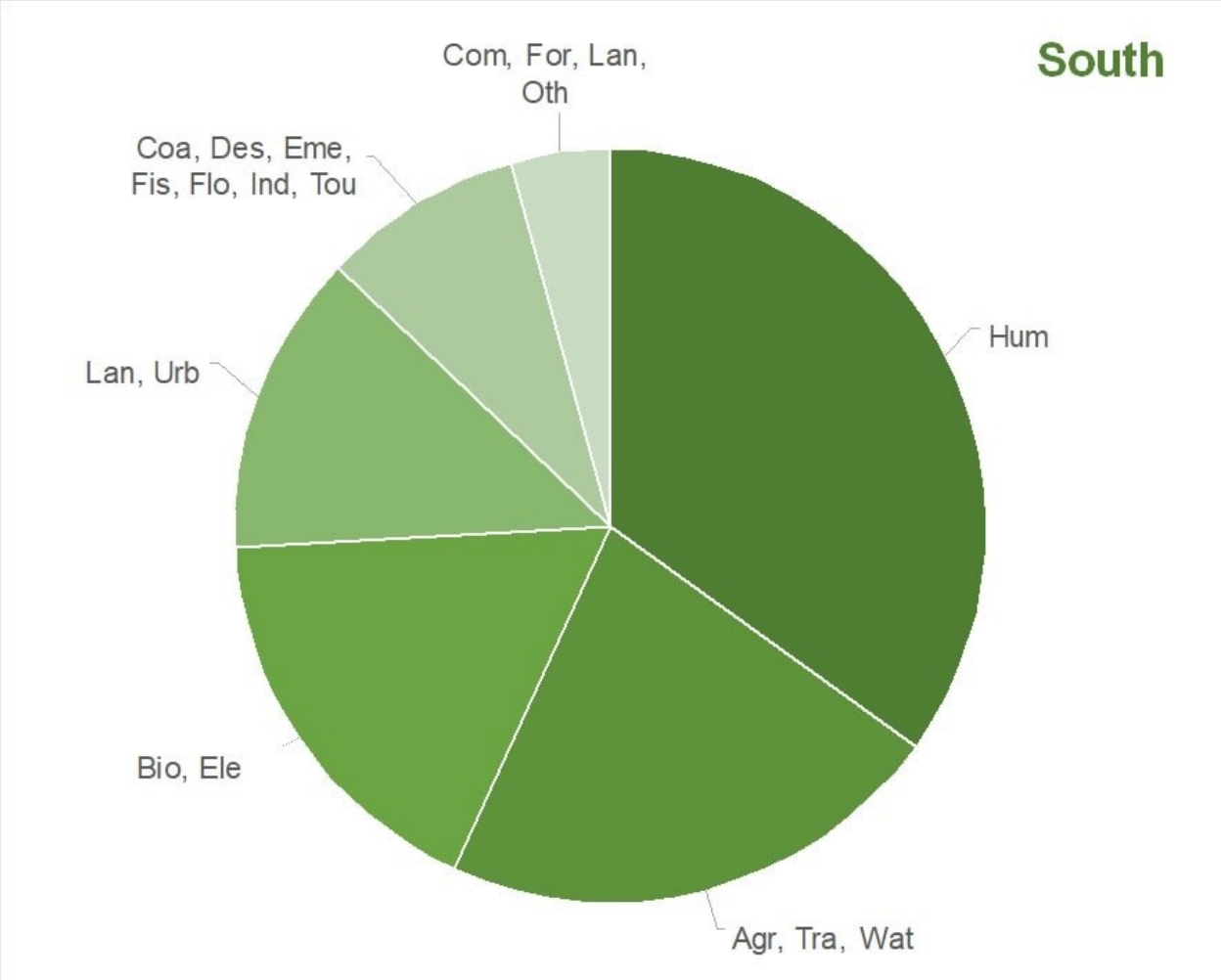

Figure 4c - Pie chart of the Southern Regional vulnerable sectors.

6.3.1 NORTHERN ADRIATIC

The northern regional Strategies differ in the principal characteristic: Friuli Venezia Giulia Region drew up adaptation and mitigation Strategies, instead of Primorsko-Goranska County that has only a mitigation strategy. The objectives of the Italian Region focus on different sectors, but the Croatian regional objective is about air quality. Their motivating factors are: EU policy and scientific research; and they are based on climate scenarios; there are solid assessment of vulnerabilities/climate risks. The Italian Strategies do not take transboundary risks, instead of Primorsko-Goranska County. Bringing organizations are involved in the decision-making process for all the Regional Strategies, but not the same for the scientific organizations, whose are involved only in the Italian ones. The vulnerable sectors and topics involved in the Strategies reflect the secondary and tertiary sectors for all the Strategies, but the primary sector is considered only by the Italian adaptation and mitigation Strategies. The Croatian Strategy is quite recent and the time span is middle term type, instead of the Italian Strategies that are prevalently long-term oriented. The measures provided are “gray” or “green” for the Italian Strategies and “soft” for all. Often, the policy instruments are regulatory and voluntary, and communication-related just for Friuli Venezia Giulia Region. Often, the state is in progress.
The approach is top-down type; often the Strategies are integrated into new or existing policies and the outcome are always evaluated by monitoring.
The main strengths are different, but the main weaknesses deal with funding funds problem for all the Strategies. The principle of cooperation and the importance of a guideline is displayed only by the Italian Region.

FRIULI VENEZIA GIULIA REGION

FVG has 6 adaptation Strategies, 5 mitigation Strategies and 2 Strategies that define adaptation and mitigation actions.
The objectives of adaptation Strategies are different, but there are many Strategies that deal with climate changes and their consequences. The prevalent motivating factor is the EU policy; all the Strategies are based on climate scenarios, there are solid assessments of vulnerabilities/climate risks carried out to support the decision-making process; any adaptation Strategy takes transboundary risks.

The most considered vulnerable sector is floods and landslides and, in a lesser way, biodiversity and ecosystem conservation. The prevalent time span is the long-term (over 5 years) and “gray” measures. The current policy instruments envisaged are regulatory and communication-related; the top-down approach is frequent, and all the adaptation Strategies are integrated in existing policies. The states of implementation are mainly in progress; some funds come from the EU and the outcomes are evaluated with monitoring.
It is possible to reassume the main strengths considering the positive aspects of scientific basis, high data quality and collaboration; but the point of weakness are limited data and resources.
The FVG mitigation Strategies have different objectives, but in general, they treat energy and sustainable production and consumption. The principal motivating factor is the EU policy, all the Strategies are based on climate scenarios and there are solid assessment of vulnerabilities/climate risk in most of mitigation Strategies. There are not very common considerations of transboundary risks and involvement of scientific organizations in the processes, but all the mitigation Strategies involved bringing organizations.
Agriculture, electricity supply and transport and infrastructure are the principal vulnerable sectors and topics involved. The time span is frequently middle-term type or, less commonly, long-term. The Strategies adopt “gray” measures, except for one that chooses the “soft” measures.
The policy instruments envisaged are regulatory, economic/financial and communication related. The prevalent communication flow is the top-down approach.
All the mitigation Strategies are integrated into new or existing sector policies and are in progress, except for one that has not started yet. The outcomes are evaluated with monitoring and sometimes with indicators.
The strong point is to reflect the EU legislation sharing the same problem and assume objective criteria.

PRIMORSKO-GORANSKA

In 2019, Primorsko-Goranska regions drew up a mitigation Strategies, that represent a regional program. The Primorsko-Goranska Strategy goal is the defence of air quality taking specific measures. The principal motivating factor of Primorsko-Goranska Strategies refers to EU policies and scientific research, both are based on climate scenarios and projections and there are solid assessments of vulnerabilities/climate risks carried out to support the decision-making process. That Strategy explicitly takes transboundary risks into account and bringing organizations are involved in the process.

Primorsko-Goranska Strategy refers to energy efficiency. The mitigation Strategies has a middle-term time span. The Strategy envisioned “soft” measures like new computer models, fire protection and exercise, education and information plan and measures for acidification, pollution, greenhouse gas emissions, energy and renewable sources.
The policy instruments envisaged to implement the Strategy are regulatory.
The prevalent communication flow is top-down type, all the Strategies are integrated in existing policy and the implementation is in progress.
The mitigation Strategy funds are European, and the outcomes evaluations are with monitoring actions. The main strength is the links between plans.
The main weakness is finding a budget.

6.3.2 CENTRAL ADRIATIC

Marche Region adopted many adaptation and mitigation Strategies, trying to reproduce the National Strategies in the regional scale. The Šibensko-Kninska County drew up a single adaptation Strategy. The objective is prevalently focus on facing climate risks and analyses the key problems. EU policy, scientific research, private sector interests, UN Summits/Reports represent the common motivating factors. The Strategies are all based on climate scenarios and consider assessment of vulnerabilities/climate risks. The Croatian Strategy takes transboundary risk, but not the Italian ones. Scientific and bringing organizations and institutions are involved in the decision-making process. The vulnerable sectors and topics involve all sectors. The time span is prevalently long-term for all the Strategies. The measures provided are “soft” or “green” for all the Strategies, and “gray” only for Marche Region. The policy instruments are voluntary and communication-related for quiet all the Strategies, and also regulatory for Italian Region. The approach is top-down one and the Strategies are integrated into existing or new policies. The state is in progress and the funds come from EU resources. The outcomes are evaluated with monitoring.
A common main strength is the importance of the links between plans, and the same weakness is funding funds.

MARCHE REGION

Marche administrations drawn up 10 Strategies: six of them are adaptation and mitigation Strategies, three are only mitigation type and one is an adaptation Strategy. The objectives are different so as to cover as many ranges as possible: development of coastal areas, renewable energy, contrasting climate change, rural and agricultural development, retrieve 2016 earthquake areas, territory protection, forecasting and prevention activities, forest management, “reserved” drinking water. One of the most interesting objectives is the attention for fire system in preventing actions, that is not directly connected with climate change, but is analysed considering the air quality in normal and fire condition, and the fundamental role of flora in limiting coastal erosion.
The principal motivating factor is the EU policy, immediately below there are the extreme weather conditions. The Marche Strategies are all based on climate changes and there are solid assessments of vulnerabilities/climate risks assessment carried out to support the decision-making process. Transboundary risks are explicitly taken by all the Strategies except ones; and scientific organizations are prevalently involved in the processes.
The most important vulnerable sectors and topics implicated in the Strategies is the biodiversity/ecosystem conservation, land use, responsibility and insurance and urban settlement.
The time span is long-term for all the Strategies, save two that are characterized by middle-term time span.
The measures are currently “green” and sometimes “soft”. The policy instruments envisaged are regulatory, economic and in little part voluntary and communication related.
The approach is top-down for all the Strategies, and the plan are integrated in existing policies, except for one case. The state of implementation is in progress.
The funds come from the EU, national, regional and local stocks.
The outcomes are evaluated by monitoring. The main strengths of the Strategies are all different: use of high quality technologies, preservation of natural gas reserve, achievement of 2030 Agenda goals, maximization of material recovery and mitigation of the quantity and danger of waste, stimulating the rural national network, rising of strong appeal of made in Italy, increasing tourism, “foret mediterraneenne”, sustainable actions, healthy entrepreneurship and economy and specific planning. The main weaknesses of the Strategies are lack of qualified job opportunities, time of updating and funding resources, amount of waste, cooperation, abandonment of the woods, structural crisis, mountain and marginal areas, vast territory, protectionist and economic excesses and finding funds. The lessons learned are calibration of work, use of photovoltaic and renewable biomass, waste disposal is a long process, cooperation

is important and the base of the Strategy, like the use of phyto-climatic strips for the environmental sustainability.

ŠIBENSKO-KNINSKA COUNTY

In 2016, Šibensko-Kninska region adopted an adaptation Strategy. The objective of Šibensko-Kninska Strategy is facing climate changes and the principal motivating factors are extreme weather conditions, EU policies and scientific research. It is based on climate scenarios and projections and there are solid assessments of vulnerabilities/climate risks carried out to support the decision-making process. That Strategies explicitly take transboundary risks and bringing organizations have been involved in the process.
The mitigation Strategies have a middle-term time span.
The adaptation Strategy policy instruments are voluntary type and communication-related.
In Šibensko-Kninska Strategy, local, regional and national institutions were active in the development phase and the prevalent communication flow is top-down type. The main strengths for the adaptation Strategy are the links between plans.
The main weaknesses are finding budget for the adaptation Strategy. Šibensko-Kninska Strategy lesson learned is the interdisciplinary importance of planning.

6.3.3 SOUTHERN ADRIATIC

There are many Strategies for Apulia Region, and one adaptation Strategy for Dubravačko-Neretvanska County. The extreme weather conditions are the common motivating factor. The Croatian Regional Strategy is not based on climate scenarios, there are no assessment of vulnerabilities/climate risks and do not involve scientific or bringing organizations/institutions, unlike the Italian ones.
All the Strategies do not take transboundary risk and involve all sectors. Dubravačko-Neretvanska County is a middle-term Strategy, instead of Apulia Region that is prevalently long-term. Apulia envisioned Strategies could be “gray”, “green” or “soft”, and the Croatian measures are “soft”. The policy instruments are prevalently economic/financial, and the approach is top-down. The Strategies are in progress and monitoring actions are final step of the Strategies. Take measures for different sectors, studying the climate conditions and the interdisciplinary of the actions are good points to realise a good Strategy.

APULIA REGION

Apulia Region drawn up three adaptation Strategies and one mitigation Strategy; their objectives are reducing geo-hydrological and coastal erosion risks, increasing the cycling mobility and reducing the traffic cars, to protect the environment and to preserve natural resources, agricultural, forest and rural innovation. Among the objectives considered there is also that of the management of fire prevention, as it is fundamental in the prevention of coastal erosion and the management of air quality in certain periods of time. The prevalent motivating factor is the extreme weather condition and below, EU policy and scientific research. Three out of four strategies are based on climate changes and there are solid assessments of vulnerabilities/climate risks assessment carried out to support the decision-making process. All of the Strategies do not take transboundary risk. Bringing organizations are involved in the process in all the Strategies except one.

The vulnerable sectors and topics involved in the Strategies are biodiversity/ecosystem conservation, floods and landslides, communication, human health, desertification, transport and infrastructure.

The time span is the long-term for all the Strategies, but not for ones, that is middle-term. Measures are “gray” for two, “soft” for one and “green” for the other one. The policy instruments envisaged to implement the Strategies are economic/financial and communication related. Two Strategies are integrated into new or existing policies, but for the others, the information is not available. All the Strategies are in progress, save one that is completed. The outcomes are evaluated by monitoring.

The main strengths are monitoring prevention and updating, system of sustainable transport, high technology system, law on air quality. The main weaknesses are long time, organization, forecast of extreme weather conditions and lack of air quality data. The lessons learned are awareness and knowledge on the part of citizens on natural risks, improve the urban environment quality, fire prevention that guarantee the quality of life in the cross border-regions, the evaluator process.

DUBROVAČKO-NERETVANSKA COUNTY

Dubrovačko-Neretvanska Strategy was drawn up in 2018 and it is a regional program. The objective of Dubrovačko-Neretvanska Strategy is the preservation of environment interrogating key-stakeholders; and the motivating factor is the extreme weather conditions.

Dubrovačko-Neretvanska Strategy involved the vulnerable sectors and topics of agriculture, biodiversity/ecosystem conservation, coastal management, fishery, tourism and leisure, water resources; and presupposes electricity supply, human health and foreign policy.
For the Dubrovačko-Neretvanska Strategy, the policy instruments envisaged to implement the Strategies are regulatory, economic/financial and voluntary.
The prevalent communication flow is top-down type. Funds are European and the outcomes are evaluated with monitoring actions.
The lack of future scenarios for climate is the main weakness of Dubrovačko-Neretvanska Strategy.

6.4 COMPARISON BETWEEN THE WP3 OUTPUTS AND THE COLLECTED REGIONAL STRATEGIES

The EU adaptation Strategy shows a list of observed and projected climate change impacts that will affect the main biogeographical regions in Europe (Figure 5) (EEA, 2017).

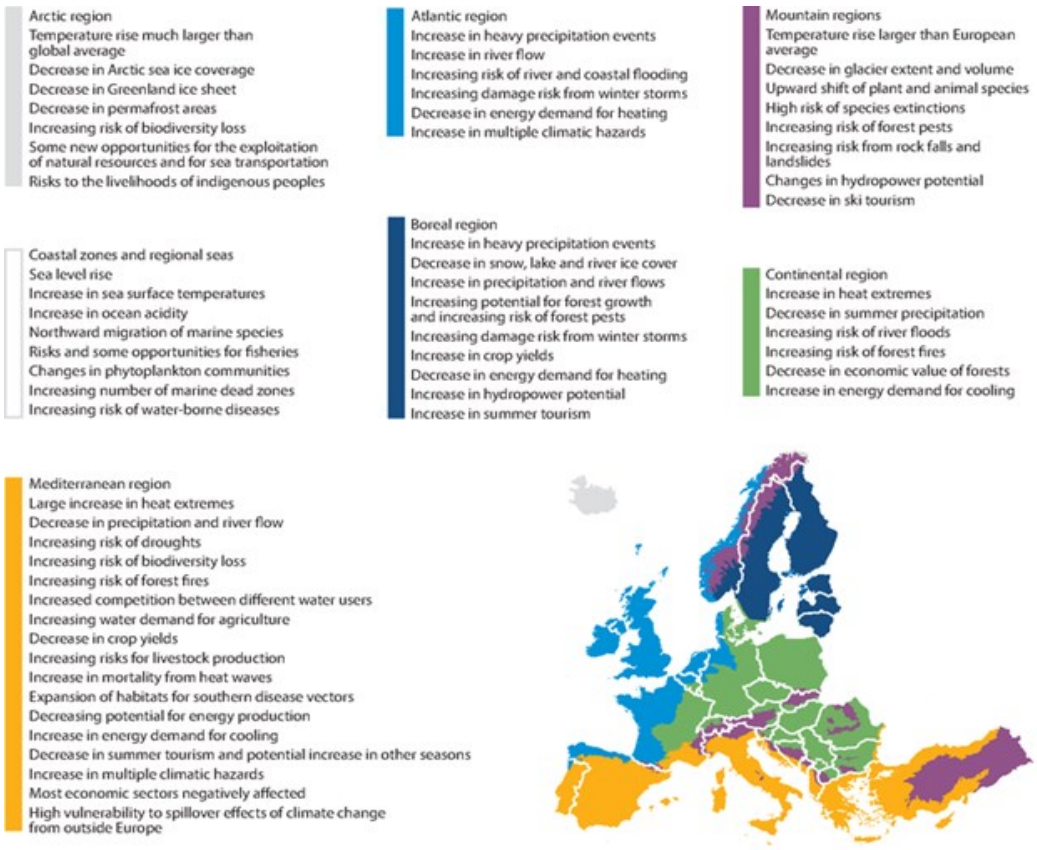

Figure 5. – Biogeographical regions in Europe
Source: EU Adaptation Strategy, implementation of 2018.

RESPONSe project involves regions included in the EU areas identified as: a) Mediterranean region, b) Coastal zones and regional seas, and c) Mountain regions. Among the most observed and projected impacts are those related to the variables: i) sea, ii) precipitation, iii) wind and iv) air temperature.

In this chapter we intended to compare the results of WP3, particularly the outputs integrated in the D3.1 and D3.2.1, with the regional strategies analysed in this report in order to understand if the path undertaken by the decision makers of the Adriatic areas are comparable to the indication of the climate scientists.

6.4.1 OBSERVED CLIMATE CHANGE IMPACTS

WP3 of RESPONSe has analysed the observed changes in the variables: i) describing the status of the sea, ii) precipitation, iii) wind and iv) air temperature for the project pilot regions, by studying the indices and/or their trends reported in Table 1.

SEA OBSERVATIONS	PRECIPITATION	WIND	AIR TEMPERATURE
Sea level height for the periods 1955-2014 [mm/yr]	Annual number of wet days (days when total daily precipitation RR ≥ 1 mm) [N/10year]	Mean annual wind speed (m/s per 100 year)	Mean annual daily maximum temperature (TX) [°C/10year]
Sea temperature averaged for depths between 30 m and 100 m for the period 1963-2016 [°C/100 years]	Annual number of heavy precipitation days (days when total daily precipitation RR ≥ 20 mm) [N/10year]	Maximum annual wind speed (m/s per 100 year)	Mean annual daily minimum temperature (TN) [°C/10year]
Salinity (practical salinity unit) averaged for depths between 30 m and 100 m for	Annual number of consecutive wet days (CWD) periods (period of at least 5 days with	Mean annual wind gust	Annual number of summer days (days

the period 1963-2016 [PSU/100 year]	total daily precipitation RR ≥ 1 mm) [N/10year]	(m/s per 100 yr)	when TX>25°C) [N/10year]
Sea temperature averaged for depths between 30 m and 100 m for the period 1963-2016 [°C/100 years]	Annual number of heavy precipitation days (days when total daily precipitation RR ≥ 20 mm) [N/10year]		Mean annual daily minimum temperature (TN) [°C/10year]
Salinity (practical salinity unit) averaged for depths between 30 m and 100 m for the period 1963-2016 [PSU/100 year]	Annual number of consecutive wet days (CWD) periods (period of at least 5 days with total daily precipitation RR ≥ 1 mm) [N/10year]		Annual number of summer days (days when TX>25°C) [N/10year]
Sea surface temperature linear trends (SST) for the period 1964-1978 [°C/decade]	Time-series of the total annual precipitation amounts (RR) [mm/day/10year]		Annual number of tropical nights (days when TN<20°C) [N/10year]
	Annual number of consecutive dry days (CDD) periods (period of at least 5 days with total daily precipitation RR ≤ 1 mm) [N/10year]		

Table 1. – Climate change variables analysed by WP3.

The indices studied by the WP3 have been compared with the indices considered in the regional Strategies described in this document, summarized in Table 2.

SEA OBSERVATIONS	PRECIPITATION	WIND	AIR TEMPERATURE
Sea level rise	Average annual precipitation	Wind seasonality	Average annual temperature

Sea temperature	Average seasonal precipitation	Interaction wind and sea	Urban heat island effect
Salinity increase	Number of storms	Wind intensity	
coastal erosion and transversal displacements	drying wetlands		
number of storm surges			
coastal floods			
surface waves			

Table 2. - Climate change variables considered by the regional Strategies.

For what concern the **sea observations**, WP3 results show an upward trend for the sea level measured in the two periods (1955-2014 and 1990-2014), but in the period 1990-2014 the values of mm/year are greater than the first period of about four times. The sea level height increases from the north to the south of the Adriatic. On the other hand, the regional Strategies which considered the increase of sea level rise were concentrated in the north and in the centre. In the southern Adriatic, only the Croatian side considered such index.

The average salinity for depths between 30 m and 100 m has been analysed in D3.1 only in the Hvar station (centre, Croatia) for the period 1963-2016 and 1993-2016. They both have a positive trend, higher in the second period. As a matter of fact, the only regions considering this index were the Šibensko-Kninska (centre) and the Friuli Venezia Giulia (north).

The sea surface temperature (north and central Adriatic) have a downward trend for the period 1964-1978 and an upward trend for the period 1979-2015. In this case, the downward trend is lower in the north stations and the upward trend is higher in the central stations. The average sea temperature for depths between 30 m and 100 m, analysed in D3.1 only for the Hvar station (centre, Croatia), shows upward trends in the 1963-2016 period with much higher temperature

increases in the last 1993-2016 period. The regional Strategies which considered the increase of sea temperature were only the Friuli Venezia Giulia (north) and Marche (centre) regions.

The regional Strategies also considered the: increase of coastal floods (Marche and Šibensko-Kninska, centre; Apulia, south); increase of storm surges (Friuli Venezia Giulia, north, and Šibensko-Kninska, centre); increase of coastal erosion and transversal displacements (Marche, centre; Apulia, south).

For what concern the variable **precipitation**, the outcomes of WP3 analysis displayed that the variation of the indices are not homogeneous among all the project regions. Particularly, the annual number of wet days index has a decreasing trend in the Italian regions and an increasing trend in the Croatian regions, even if not always significant. In addition, the annual number of consecutive wet days index shows an upward trend for FVG (north, Italy), downward for Primorsko-Goranska (north, Croatia) and no trend for all other regions. Furthermore, the annual number of heavy precipitation days index has a general increasing trend for all the regions, with the highest values for the Croatian Primorsko-Goranska (north) and Šibensko-Kninska (centre) regions. Accordingly, Friuli Venezia Giulia (north), Marche and Šibensko-Kninska (centre), and Dubrovačko-Neretvanska (south) regional Strategies take into account the increasing number of heavy precipitation days.

The time-series of the total annual precipitation amounts do not show trend for all the project areas, and most values are not significant. On the other hand, the Strategies of Primorsko-Goranska (north), Dubrovačko-Neretvanska and Apulia (south) consider a decreasing of annual precipitation.

Finally, the analysed annual number of consecutive dry days shows no statistic significant trends, but the increasing of dry periods and droughts has been considered in the Strategies of almost all the region: exception is Dubrovačko-Neretvanska (south).

For what concern the variable **wind**, WP3 reports evinced: the increase of the mean annual wind speed and wind gusts for locations of Lignano Sabiaddoro, Brindisi, Šibenik and Dubrovnik; the increase of the both annual mean and maximum of the wind speed for Montemarciano and Cres according to the ERA5 reanalysis (D3.1); the decrease of the maximum annual wind speed and wind gusts for locations of Lignano Sabiaddoro, Brindisi, Šibenik and Dubrovnik; the decrease of both annual mean and maximum of the wind gusts for Montemarciano and Cres according to the ERA5 reanalysis (D3.1).

The regional Strategies of FVG, Marche, Šibensko-Kninska and Dubrovačko-Neretvanska considered the wind variable but in the view of the seasonality, the wind-sea interaction and the intensity.

For what concern the variable **air temperature**, the WP3 analysis shows that the air temperature related indices have rising and statistically significative trends in all the regions involved in the project. Particularly, the increase of mean annual daily maximum temperature is higher in the north and the centre, while the mean annual daily minimum temperature is higher in the central Adriatic region. Moreover, from the analysis appears that in the north the annual number of summer days has the highest increase, while the annual number of tropical nights has the lowest increase.

According to these results, all the regions considered in their Strategies the increase in the average air temperature and in Apulia region, the Strategies focused also on the heat island effects.

6.4.2 PROJECTED CLIMATE CHANGE IMPACTS

WP3 of RESPONSe has also analysed the projected changes, by the end of 21st century, in the variables: i) describing the status of the sea, ii) air temperature, iii) precipitation, iv) wind and iii) tourism activities for the project pilot regions, by studying the indices reported in Table 3.

SEA PROJECTIONS	PRECIPITATION	WIND	AIR TEMPERATURE	TOURISM ACTIVITIES
Sea Surface Temperature (SST)	Mean daily precipitation	Daily wind speed	Mean daily temperature	Climate Index for Tourism (CIT)
Sea Surface Salinity (SSS)	Median daily precipitation		Median daily temperature	
Sea Surface Height			Heating Degree Day	

(SSH)			(HDD)	
			Cooling Degree Day (CDD)	

Table 3. - Climate change future variables analysed by WP3.

For what concern the variables describing the **sea** climate, the partners responsible of WP3 analysed three indices that refer to the temperature, the salinity and the level of the sea. It is possible to compare the outputs of WP3 future projection and the outcomes of Strategies analysis. The Sea Surface Temperature (SST) index and Sea Surface Salinity (SSS) index, analysed in the WP3, shows increasing trends, as emerged from the analysis of some FVG regional Strategies. Both these indices will increase higher in the middle future (2041-2070) than in the near future (2011-2040) like it is shown in the WP3 studies and this is coherent with the other parts of Europe and with the global warming. These values could be important for every region because there will be consequences like the changing of the sea fauna with a resulting impact in economic activities. The Sea Surface Height (SSH) index analysis shows a decrease in the period 2011-2040 in all the Adriatic Sea and a consequent increase in the middle future. The range of possible changes in the SSH as simulated by the model analysed in the D3.2.1 is too conservative when compared to similar studies. Consideration of the additional coupled regional atmosphere-ocean/sea models is advised, as soon as their results become publicly available.

SSH is the only index considered in some of the Strategies analysed (FVG and Primorsko-Goranska) and only for the case of an increase of the sea level. Šibensko-Kninska county is evaluating the SSH to verify if it is increasing. Other regions do not mention studies about these indices even if sea changing condition will influence many economic activities and will change heavily the shape of the Adriatic basin. This consequence could change also the demographic and urban characteristics of the area.

For what concern the variable **precipitation,** WP3 reports studied the median and mean ensemble values of mean sesonal precipitation related to RCP4.5 (Moderate Emission Scenario) and RCP8.5 (High-Emission Scenario) scenarios (IPPC, 2001). The results of the studies state that in the near and middle future the seasonal rainfall will change in the whole Adriatic area. In particular, in the RCP 4.5 scenario precipitation will increase in all season except for JJA (June-July-August) in the near future (2011-2040); precipitation will increase in SON (September-October-November and will decrease in JJA in the middle future (2041-2070). In RCP 8.5

scenario precipitation will decrease in JJA in both period 2011-2040 and 2041-2070; instead of a moderate increase in DJF (December-January-February) in the middle future.

These studies for the future precipitation projections has been made also by some regions like FVG, Primorsko-Goranska and Dubrovačko- Neretvanska. However, in the Strategies they declared a general decrease in the amount precipitation in the year, not a variation in the seasonal distribution. This analysis is important for all the regions because it will describe the future consequences of the precipitation distribution change like dry periods or sudden storms in other seasons.

For what concern the variable **wind,** WP3 partners studied the daily wind speed in the RCPs scenarios and the outcomes affirm that the changes in the wind speeds by the end of the 21st century are low over the Adriatic region.

Accordingly, the wind variable is considered only in the Primorsko-Goranska Strategy, where it is reported that mean wind speed will increase in summer and autumn for the period 2011-2040 and will be unchanged for the period 2041-2070 and maximum speed will be unchanged for the period 2011-2040 and will decrease for the period 2041-2070. The consideration of the variable wind is important for all regions because the consequences could bring serious impacts in sea waves or important innovation i.e. in wind production.

For what concern the variable **air temperature** WP3 studies analysed the current relative mean change with the future relative mean change, in the Adriatic region, for each season and in relation with the RCPs scenarios in the two periods 2011-2040 and 2041-2070. For the RCP 4.5 scenario, during the first period, the near future, the temperature will increase in all seasons. In the middle future, there will be the lowest increase during MAM (March-April-May), whereas in JJA (June-July-August) the temperature will increase the most. The range of increase is between 1-1,5°C and 2-2,5°C. For RCP 8.5 scenario, the temperature increase is lowest than in RCP 4.5 for the 2011-2040 period and it is much higher during 2041-2070 period. In the near future, the temperature increase range between 0,5-1,5°C, with a minimum in MAM and a maximum in JJA. During the middle future, the range will increase between 2-3°C from MAM to JJA.

The studies of WP3 provide also the evaluation of two indices: Heating Degree Day (HDD) and Cooling Degree Day (CDD) related with the scenarios RCP4.5 and RCP8.5. These two indices are usually used to infer average air temperature data. The HDD quantifies the demand for energy needed to heat a building when the average daily temperature is less than 18°C. The CDD

measures the demand for energy needed to cool buildings when the average daily temperature is over 18°C. WP3 analysis show that HDD decrease in near and middle future in Southern Europe and in the Mediterranean regions, so it means that average hot days will increase; on the contrary, CDD will increase, and consequently cold days are going to decrease during the year. In summary, in the future air temperature will increase, and cold days will decrease (WP3, D3.2.1).

These indices are considered also in some Strategies of FVG, Primorsko-Goranska county and Dubrovačko- Neretvanska county. The other regions do not consider these indices in their Strategies. However, future air temperature rises and related consequences, like desertification and less heating energy consumption, paired with the progressively higher energy demand to cool internal environments, should be necessarily considered.

For what concern the variable **tourism,** the Climate Index for Tourism (CIT) is an index, used for Mediterranean climate change studies, that allows assessing the sun, sea and sand (3S) weather resource (Amengual, 2011). Tourism is one of the largest European Mediterranean and Adriatic economic sectors worldwide and beach-based holidays are a key resource income source (Amengual, 2011). 3S tourism is strongly linked to a set of atmospheric variables such as temperature, rainfall, relative humidity, cloudiness and wind speed (De Freitas, 1985). Global environmental change threatens these conditions and 3S tourist transportation activities directly affect climate change through greenhouse gas emissions and seasonality in the industry for many regions worldwide (Amengual, 2011).
Tourism activities depend on weather conditions and, in the Adriatic Sea, WP3 studies evaluated a decrease in the number of days with ideal conditions in summer (-30 days), but an increase in the number of days with acceptable conditions in spring (+30 days) and ideal conditions in autumn (WP3, D3. 2. 1). This means a change in the seasonality of tourism activities caused by the effect of unacceptable, acceptable and ideal changing conditions. Generally, WP3 reports stated that unacceptable conditions will occur in the future from November to March at 7 am; acceptable conditions from April to October at 7 pm; and ideal conditions from May to September at 7 am, increasing from North to South Adriatic, and from April to October at 2 pm.
Generally, the climatic preference would extend from May to October, instead of June, July and August.

3S tourism activities considered for Adriatic basin include sportive common activities that are played in the basin. The observations in the activities change are:

- **Cycling,** it becomes unsuitable in summer, more suitable in spring and autumn and there are not significant changes in winter;
- **Cultural activities** and **football,** will not change their comfortable condition;
- **Touristic potential,** would degrade in summer;
- **Golf,** will decrease in winter, will slightly increase in summer and will remain unchanged the most suitable condition in spring and autumn;
- **Motor boating**, will increase in all seasons;
- **Sailing**, will slightly decrease in summer and the comfort period will not change (spring and autumn);
- **Hiking,** will decrease ideal condition in summer.

Tourism is one of the vulnerable sectors and topics involved in the Strategies of all the analysed Italian regions and Croatian counties, but no Strategy evaluated future projections of this sector. Because of this, a good assessment of future condition of tourism could be a necessity for future Strategies or updating. Knowing future projections and with a different planning, it could be possible to reduce tourism vulnerability reorganizing the programme of the touristic activities, or the connected activities i.e. holidays, opening of touristic facilities, exhibitions, tours.

6.5 SUB-REGIONAL STRATEGIES

Sub-regional Strategies reflect the EU, National and Regional Strategies compared in the local scale. Often, it occurs that at the local level, there are many more Strategies that involve the same vulnerable sectors or topics in different Subregions, but many other sectors are not considered (Figure 6). Every sector is deepened in each Sub-region, but these have not yet implemented adequate Strategies for each missing sector; or a certain sector is not considered in that Sub-region at all, based on the needs of the territory. For example, the northern Sub-regional Strategies did not involve desertification and drought, emergency and rescue services, foreign policy, responsibility and insurance and urban settlement; the central Strategies did not consider desertification and drought, floods and landslides and foreign policy; the southern analyzed sub-regional Strategies did not involve fishery and foreign policy.

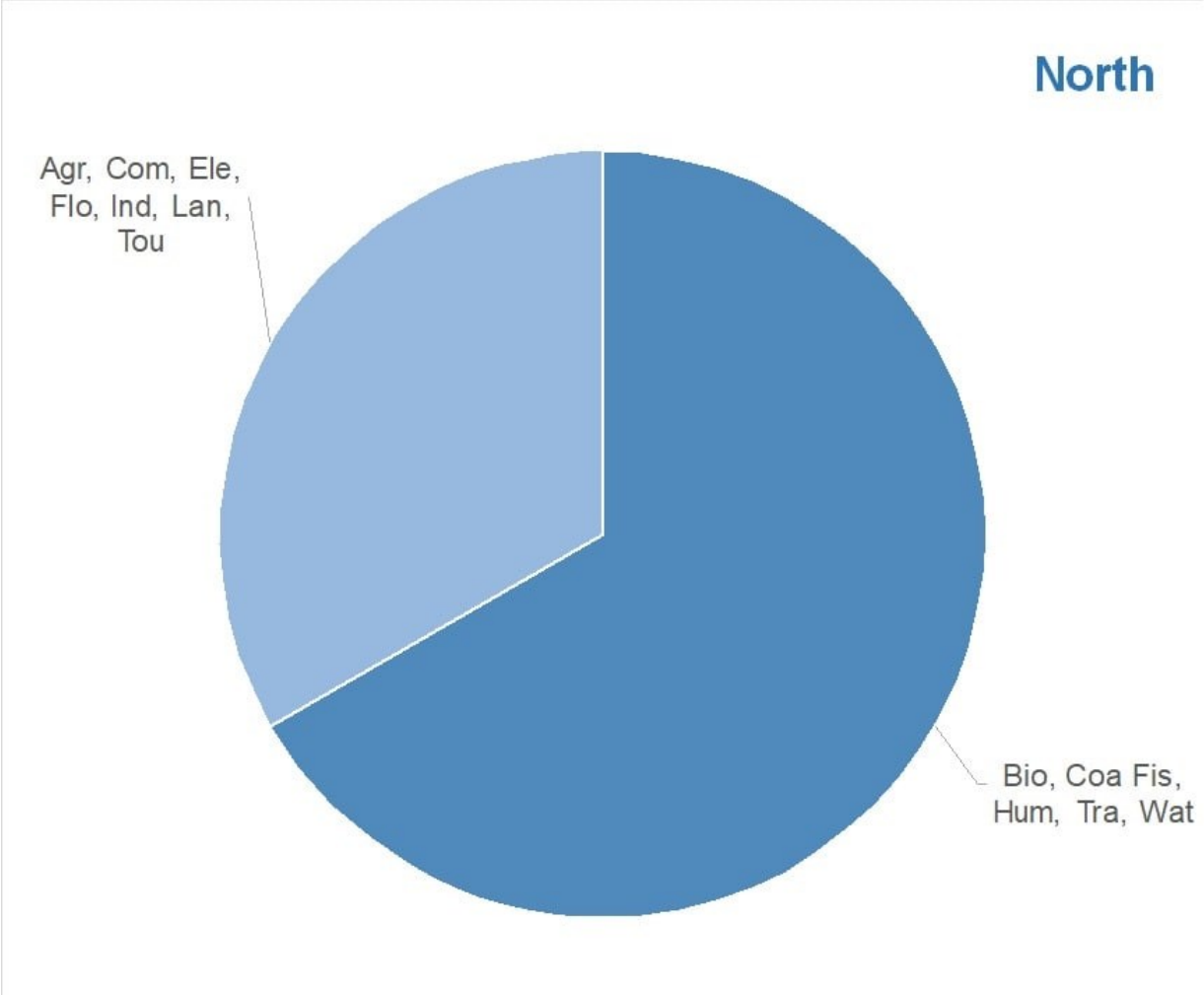

Figure 6a. - Pie chart of the Northern Sub-Regional vulnerable sectors.

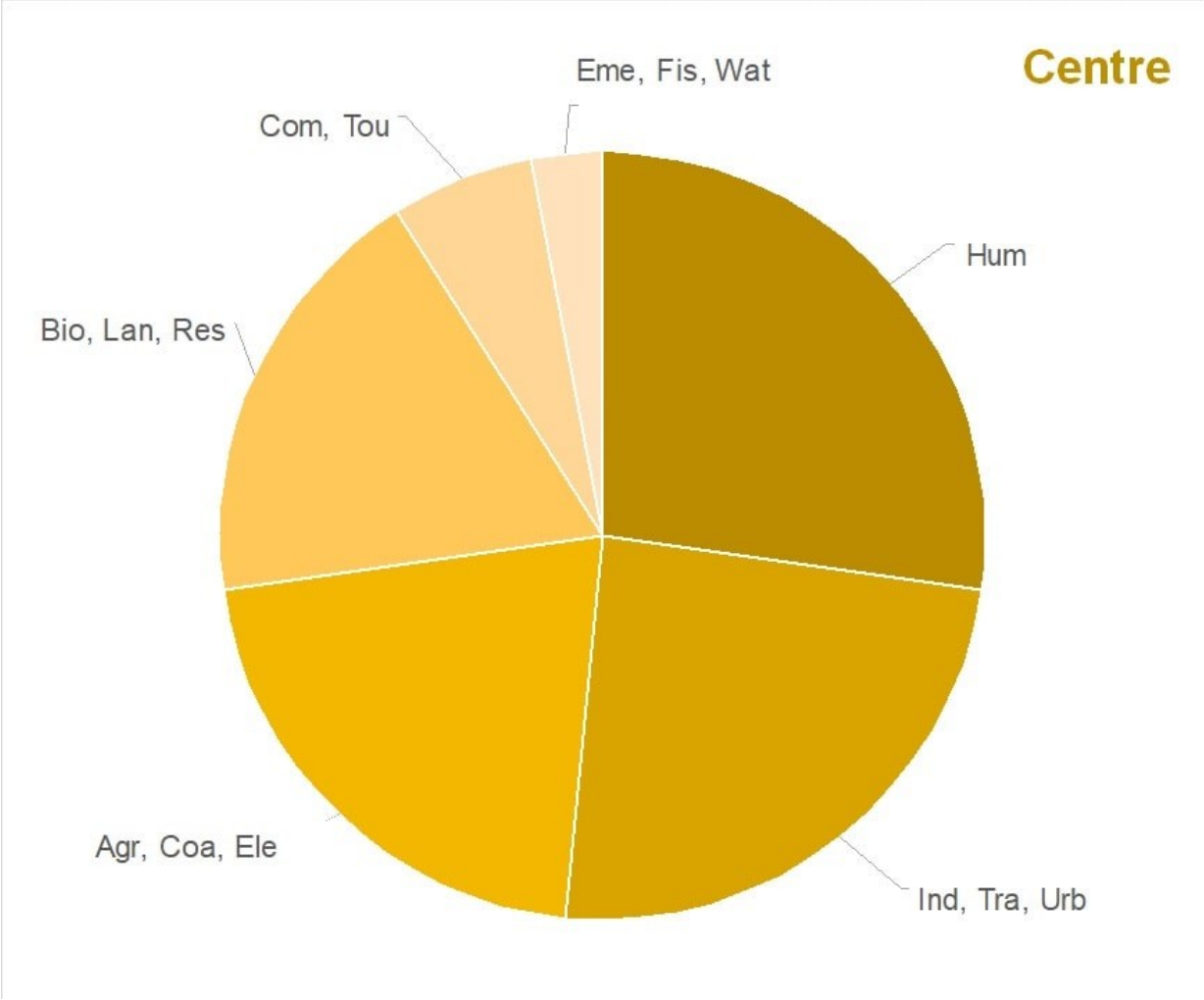

Figure 6b. - Pie chart of the Central Sub-Regional vulnerable sectors.

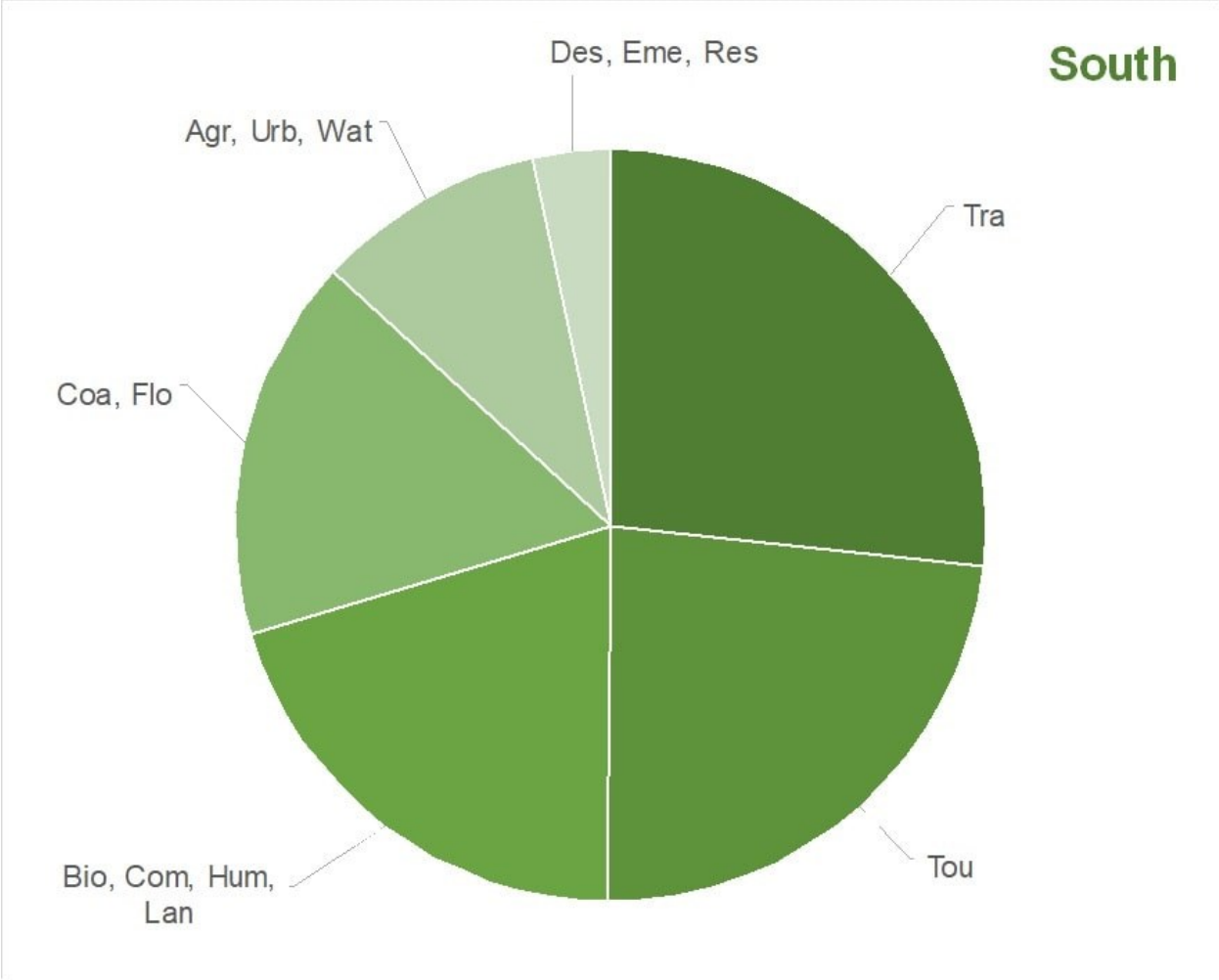

Figure 6c. - Pie chart of the Southern Sub-Regional vulnerable sectors.

6.5.1 NORTHERN ADRIATIC

The Friuli Venezia Giulia Sub-regions reflect the structure of the regional Strategy, but the Primorsko-Goranska Sub-County Strategy is an adaptation strategy instead of a mitigation Strategy. Extreme weather conditions and EU policy are the common motivating factors. They are based on climate scenarios and there are assessment of vulnerability/climate risk. In the Strategies are involved scientific organizations/institutions and transboundary risks are not considered. All vulnerable sectors and topics are analysed. “Green” measures are envisioned for all the strategies and the policy instruments envisaged are regulatory, and often communication-related. The Strategies are in progress and funds come from EU sources.

The Sub-regional Strategies are discussed in the section below.

FRIULI VENEZIA GIULIA REGION

The Strategies analysed for the Sub-regions of Friuli Venezia Giulia are one adaptation Strategy, one mitigation Strategy and one mitigation and adaptation Strategy. The first is the Shaping a Holistic Approach to Protect the Adriatic Environment between coast and sea (SHAPE) and his objective is the realization of a multilevel and cross-sector governance system that could guarantee a sustainable development policy management of marine-coastal system; the second is the Sustainable Mobility of Coastal Tourist areas and the Cross-border Hinterland (MobiTour), that is focused on sustainable mobility plans for a new sustainable mobility services; and the third is the Action Plan for Sustainable Energy and Climate (SECAP) of Latisana, whose objective is the creation of a resilient community (citizen and infrastructure), with a reduction of energy consumption and GHG emissions.
The motivating factor for all the Strategies analysed is represented by the EU policies. The SHAPE and the SECAP Strategies are interested by extreme weather conditions.
The Strategies are based on climate scenarios and projections, taking into account geographical specificities and best available science, there are solid assessments of vulnerabilities/climate risks carried out to support the decision-making process and explicitly transboundary risks are not taken into account.
Scientific organization/institution participate in the first and second Strategies, instead of bringing organizations whose take part in the first and third Strategies.

The vulnerable sectors and topics involved are different between the Strategies: the SHAPE considers biodiversity/ecosystem conservation, coastal management and fishery; the MobiTour wrecks transport and infrastructure; the SECAP involves communications, floods and landslides, human health and water resource management.
The time span of the adaptation and mitigation Strategies is middle-term, instead of the SECAP that is long-term time span.
The envisioned measures are “soft” for all the Strategies and “gray” for the first and second ones.
The policy instruments envisaged to implement the Strategies are communication for the SHAPE and regulatory for the second and third one.
The stakeholders involved in all the Strategies are the citizens, the first considers also politicians and the second the tourists.
The prevalent communication flow is bottom-up for all the Strategies and top-down for the SECAP.
The SHAPE is completed, instead of the MobiTour and the SECAP are in progress.
The first and the second Strategies have project funds, the third Strategy has local, regional and national funds.
The evaluation of the SHAPE outcomes provides Environmental impact assessment (VIA) and strategic environmental assessment (VAS), in the second Strategy it is not shown and in the third Strategy the Monitoring Emission Inventory (MEI) is foreseen.
The main strength of the first Strategy is the integration of new and traditional techniques, for the third Strategy an innovative point is represented by the MEI tool, also if it is very expensive. The SHAPE Strategy show that a share approach is fundamental for a good result, because many problems transcend regional and national boundaries and a shared approach may allow to better address the global challenges.

PRIMORSKO-GORANSKA COUNTY

JOINT SECAP is an adaptation Strategy of Primorsko-Goranska County sub-region.
The objective is represented by raising awareness of citizens about climate change risks and measures.
The motivating factors of the Strategy are EU policies, the extreme weather conditions and scientific research.
Climate scenarios and projections represent the base of the Strategy, and there are solid assessments of vulnerabilities/climate risks carried out to support the decision-making process.
Bringing organizations/institutions participated in the JOINT SECAP.

The vulnerable sectors and topics involved in the Strategy are electricity supply, human health, industry and transport and infrastructure, but also coastal management and the primary vulnerable sectors like agriculture and fishery.
The adaptation Strategy has a long-term time span.
The envisioned measures are “soft” and “green”.
The policy instruments envisaged to implement the Strategy are regulatory and communication-related.
The process of the Strategy is in progress and the funds come from EU resources.

6.5.2 CENTRAL ADRIATIC

The Strategies are prevalently mitigation type and the principal motivating factors are extreme weather conditions and EU policy. All the Strategies are based on climate scenarios and there are vulnerability/climate risk assessment. Often, the Strategies do not take transboundary risks. In the Italian Sub-regions scientific and bringing organizations/institutions are involved in the processing of making. Many vulnerable sectors are involved; “gray” and “soft” measures are provided; and often, the policy instruments envisaged are regulatory. The communication flow is bottom-up in all cases; and the state is “in progress” for all the Strategies.

MARCHE REGION

One adaptation Strategy and six mitigation Strategies have been analysed for the Marche Region. The objective of the adaptation Strategy is to protect beach and cliff areas against erosion. All the mitigation Strategies are Sustainable Energy Action Plan (SEAP) for the Ancona, Pesaro, Senigallia, Fermo, San Benedetto del Tronto, Civitanova Marche Municipalities, and their principal focus is the 20% reduction of CO2 gas emission related to renewable energy resources. The motivating factors of all the Strategies are extreme weather conditions, EU and UN policies, economic sector and the condition of recognising opportunities and examples from other countries or regions.

The Strategies analysed are based on climate scenarios and projections, taking into account geographical specificities and best available science and there are solid assessments of vulnerabilities/climate risks carried out to support the decision-making process. Any Strategies take transboundary risk, but scientific and bringing organizations participate in all the Strategies.
The vulnerable sectors and topics involved are the same for the SEAP Strategies like agriculture, biodiversity/ecosystem conservation, coastal management, emergency and rescue service, electricity supply, human health, industry, land use, responsibility and insurance, transport and infrastructure, urban settlement. The adaptation Strategy considers only the coastal management and tourism and leisure.
The time span is long-term for all the Strategies, excepting for the Senigallia SEAP. The envisioned measures are “green” for the adaptation Strategy and “gray” and “soft” for the mitigation ones.
The policy instruments envisaged to implement the Strategies are communication related for the adaptation Strategy and regulatory and Economic/Financial for the SEAP Strategies.
The prevalent communication is top-down, and bottom-up for the mitigation Strategies. All are in progress, funds come from the MATTM funds for the adaptation Strategy and from the Municipalities fund for the mitigation Strategies. Ancona SEAP takes funds from public and private resources, instead of Pesaro SEAP takes provincial or regional funds. The Strategies are evaluated with monitoring.
The main strengths are: the project planning force for adaptation Strategy, the cooperation and the involvement of municipalities but also non-political stakeholders for the mitigation Strategies.
The main weakness is the lack of funds, in the availability and in the uncertainty of the amount of actions.

ŠIBENIK COUNTY

In the Šibenik Region there are two Sub-regional mitigation Strategies: Environmental Protection Program of the City of Šibenik, for the period from 2017 to 2020 (Šibenik Program 2017-2020) and Protection program for the air quality, the ozone layer, mitigation and adaptation measures for climate change (Protection program).
The objective of the Šibenik Program 2017-2020 is to analyse the environmental state and to define purpose in according with the national environmental Strategy; the Protection program focuses on the goals for ozone protection layer and climate change mitigation.
The motivating factors of the Strategies are EU policies for all the Strategies, the extreme weather conditions and media influence for the Protection program.

The Strategies has been based on climate scenarios and projections, taking into account geographical specificities and best available science and there are solid assessments of vulnerabilities/climate risks carried out to support the decision-making process.
Protection program Strategy do not take transboundary risks; but both the mitigation Strategies do not expect the involvement of scientific organizations/institutions and bringing organizations/institutions.
The vulnerable sectors and topics involved in all the Strategies are electricity supply, human health, industry and transport and infrastructure. The other sectors are differently present in each Strategy, covering almost all the sectors requested; the Šibenik Program involves principally the primary sectors, and the Protection program involves mostly the secondary sectors.
The mitigation Strategies have a middle-term time span, instead of the adaptation Strategy that is long-term.
The envisioned measures are “soft” for all the Strategies, “green” for Protection program and “gray” for the Šibenik Program.
The policy instruments envisaged to implement the Strategies are regulatory, and economic/financial for Šibenik Program 2017-2020.
The bottom-up communication flow is prevalent, the Strategies are in progress and the funds come from EU resources.

6.5.3 SOUTHERN ADRIATIC

It is not possible to make a comparison between Italian and Croatian Sub-Regional Strategies because there are not present southern Sub-regional Strategies for Croatia.

APULIA REGION

Several Apulia Sub-regional Strategies analysed are divided in five adaptation Strategies and six mitigation Strategies.
The adaptation Sub-regional Strategies are: Regional executive project POR 2000-2006 "Monitoring of coastal defense operations and the evolution of the coasts" of Brindisi (POR 2000-2006 Brindisi); Municipal coasts plan of Rodi_Garganico (Rodi_Garganico); Life Master Adapt - MAinSTreaming Experiences at Regional and local level for adaptation to climate change (Life Master Adapt); Regional executive project POR 2000-2006 "Monitoring of coastal defense

operations and the evolution of the coasts" of Giovinazzo (POR 2000-2006 Giovinazzo); Regional Nature Park Territorial Plan: "Coastal Dunes from Torre Canne to Torre San Leonardo" (Regional Nature Park).
POR 2000-2006 Brindisi objective is the granting of the use of the coast and identification of a series of interventions that make this use environmentally sustainable, fair, accessible to the community.
Rodi_Garganico Strategy focuses on the protection of nature and territory; Life Master Adapt want to create a multi-level governance tools to react to climate change impacts; POR 2000-2006 Giovinazzo target is a projection of naturalistic and historical areas and to create a friendly tourism. Regional Nature Park focus on the conservation of nature and biodiversity.
One of the motivating factors of the first, second and third Strategies is the extreme weather conditions. The EU policies are a motivating factor for all the analysed Strategies. The scientific research is a developing factor for all the Strategies except Life Master Adapt; instead of the private sector that motivates POR 2000-2006 Brindisi, Rodi_Garganico and POR 2000-2006 Giovinazzo. The Regional Nature Park Strategy has been developed considering also recognizing opportunity factor.
All the Strategies are based on climate scenarios and there are solid assessments of vulnerabilities/climate risks carried out to support the decision-making process, except for POR 2000-2006 Brindisi. None of them takes transboundary risks.
Scientific organizations/institutions participated only in POR 2000-2006 Brindisi and Life Master Adapt Strategies; instead of bringing organizations participated in every Strategy except Regional Nature Park Strategy.
The vulnerable sectors and topics involved in the Strategies are almost similar and it is possible to say that the adaptation Strategies cover all the sectors.
The time span is long-term for all, except for Life Master Adapt.
The envisioned measures are "gray" for all the Strategies, save Life Master Adapt Strategy; "green" for POR 2000-2006 Brindisi and Regional Nature Park Strategies and "soft" for Life Master Adapt.
The policy instruments envisaged to implement the Strategies are: economic for all, excepting Life Master Adapt that is multi-level governance instruments envisaged; and communication-related for all.
The communication flow is top-down; all the Strategies are integrated into new or existing sector policies and are in progress.
Funds come from EU, project or public reserve and the outcomes are evaluated with monitoring for all the Strategies, save Rodi Garganico and Life Master Adapt that consider scenarios.

The main strengths of the Strategies are: quantitatively and qualitatively regulation of the interested area that could be used for concessions, free use and free use accompanied by the presence of services, as well as increasing accessibility for the Rodi_Garganico Strategy; coordination between the different levels of governance for Life Master Adapt; growth of rural, cultural and sport tourism for Regional Nature Park.
The POR 2000-2006 Brindisi and Regional Nature Park main weaknesses respectively are the contrasting regulations and lack of appropriate technologies. The lesson learned for the first and second Strategies is common, and it concerns safeguarding and enhancing coast and tourism; the lesson learned of the third Strategy is the replicability of guideline for all the EU Countries. By the last adaptation Strategy, it is possible to learn that improving the quality of urban environment, naturalistic and landscape values is very important for the human health and earth preservation.
The Apulia mitigation Sub-regional Strategies are: Plan of Cycling Mobility of Foggia province (Cycling Mobility), Municipal Emergency Plan of Brindisi for Civil Protection - Geo-hydrological risk (Plan of Brindisi), Action Plan for Sustainable Energy (PAES), Waste prevention and more recycling (Waste), River Contracts - Pilot project of the Royal Canal basin (Royal Canal Basin), Urban Planning for Sustainable Mobility of Molfetta (PUMS).
The objective of the Cycling Mobility is to reduce traffic car effects, introducing a more intensive cycling mobility with a new bicycle lane; the Plan of Brindisi focuses on the preservation of territory, surveilling the territory; PAES objective is the reduction of 20% GHG emissions with renewable resources; the Waste principal point is to limit the production of dangerous waste; the focus of the Royal Canal Basin Strategy is the protection and management of water resources, drawing up a document of intent; PUMS objective is the development of infrastructure according to environmental sustainability.
Extreme weather conditions are one of the motivating factors of the Plan of Brindisi, PAES and Royal Canal Basin; the EU policies are important for all the Strategies, save for the Plan of Brindisi, whose depend on economic conditions. The motivating factors of PAES Strategy are private sectors interest, recognising opportunities and examples from other countries/regions.
All the Strategies, excepting the first, are based on climate scenarios and projections, taking into account geographical specificities and best available science and there are solid assessments of vulnerabilities/climate risks carried out to support the decision-making process. Any Strategies takes transboundary risks; any Strategy involve scientific or bringing organization/institution, save for Royal Canal Basin Strategy.
The vulnerable sectors and topics involved in the Strategies are similar or are complement each other because of all sectors has been considered.

The time span of all the Strategies is long-term; the Policy instruments envisaged are all communication-related, all economic exception for Plan of Brindisi Strategy, voluntary for the last one and the Royal Canal Basin Strategy.
The prevalent communication flow is the top-down type, except for the Royal Canal Basin that is bottom-up.
All the mitigation Strategies has been integrated into new or existing sector policies; many of them are in progress, but not the Waste Strategy that is completed and the Royal Canal Basin that not started yet.
The evaluation of the outcomes of the Strategies takes place through monitoring.
The main strengths of the Strategies are a sustainable transport for the first one; a system of safeguarding for the second; an integrated regional policy for the third and a good coordination between the responsible for the fourth.
The main weaknesses are the organization plan for Cycling Mobility Strategy; timing information transmission for the Plan of Brindisi; to inform citizens for Waste Strategy and the lack of appropriate technologies for the PUMS.
All the mitigation Strategies have a lesson learned, except for the last Strategy and respectively are optimization of urban environment, to realise an efficient coordination, implementation of sustainability concept by municipalities, containment of growth rather than a reduction in pollution, valuing river territories.

7 CONCLUSION

The EU Strategies represent the guidelines of all the other Strategies at national, regional and sub-regional level. The adaptation and mitigation actions established to respond to climate change have been considered by all the administrations.

The study collected the analysis of 65 adaptation and mitigation Strategies: 2 European Strategies, 3 Italian National Strategies, 2 Croatian National Strategies, 31 Italian Regional Strategies, 3 Croatian Regional Strategies, 21 Italian sub-regional Strategies and 3 Croatian sub-regional Strategies. Particularly, the Northern Regional Strategies analysed are 14, the Central Regional Strategies are 11 and the Southern Regional Strategies are 9. The Northern sub-regional Strategies analysed are 4, the Central sub-regional Strategies are 9, the Southern sub-regional Strategies are 11.

The Strategies analysed at the national level reflect the indications of the EU adaptation and mitigation Strategies to implement specific Strategies for their territories. In effect, the characteristics between Italian and Croatian National Strategies are very similar. The objective of the Italian and the Croatian adaptation Strategies is preparing a resilient Nation to climate changes. The mitigation Strategies focus on the achievement of the reduction of GHG emissions spreading renewable and energy efficiency. All national Strategies involve almost all vulnerable sectors, the common approach is top-down. Italian mitigation Strategies take transboundary risks. All national actions have a long-term time span. All Italian and Croatian Strategies envision “grey”, “green” and “soft” measures. The funds come from EU and monitoring is prevalent for the evaluation of the planned activities. The Strategies of both Nations have the intent to create a document with the principal targets for a good adaptation and mitigation planning.

The Strategies analysed at the regional level follow the indications of European and National Strategies, adjusting them to the territory. All Strategies give importance to almost all vulnerable sectors, but the distribution is different along North, Centre and South. The Regional Strategies approach is generally top-down, and it is widely recognized the necessity of more cooperation. The time span for Italian Regional Strategies is generally long-term, unlike the Croatian time span that is middle term. Only Croatian Regional Strategies consider transboundary risks.
In detail, the Northern Regional Strategies differ in the type of Strategy: FVG adopted adaptation and mitigation Strategies, instead of Primorsko-Goranska County that has only one mitigation

strategy. North Croatian Regional Strategy provides only “soft” measures; contrariwise, FVG promotes “grey” and “green” measures. A common problem is finding fund.
The Central Regional Strategies involve Marche region and Šibensko-Kninska County. The main difference is the adoption of just one adaptation Strategy by Croatian region, while the Italian one implemented many adaptation and migration Strategies. The funds come from EU resources, but it is felt difficult to access them.
Also, the Southern Regions are characterized by many Strategies for the Italian Region (Apulia) and just one adaptation Strategy for Dubravačko-Neretvanska County. The Croatian County does not involve scientific or bridging organizations/institutions, unlike Apulia Region. Croatian measures are “soft”, whereas the Italian Region plans all type of measures. A common final step of the Strategies is monitoring.

Often, the Regional Strategies are long-term oriented, and currently in progress. The reason of this, is the diversity of sectors interested by climate changes and the difficulty of coordinating them. The management of multiple sectors in the same context is a common problem encountered by managers during the implementation phases of the established Strategy. Transboundary risks very often are not considered, but even if every Country/Region/Subregion takes singularly prevention and preliminary actions, among the most important features to achieve the final objective of mitigation and adaptation are the cooperation, the collaboration and the shareability of actions. The policy instruments envisaged are always regulatory and often communication and information related, and the approach is prevalently top-down. Undoubtedly, the role of policy makers is crucial, but the involvement of all stakeholders is necessary too. In this way, citizens could be informed about the risks of his territory and the instructions to follow to be more responsible. Furthermore, it is possible to make more resilient every level of society and overcome some of the problems caused by climate change impacts.

One of the most important aspects taken by many administrations in their Strategies is the constant monitoring of the planned actions; in this way the established measures are controlled in their application and actual functionality.

This work also identified some common problems: i) finding funds, because of the actions of the Strategies require large sums in order to be realized; ii) finding reliable data on which to base the researches, because before there were no technologies suitable for certain types of analysis, or because they have never been verified; iii) organizing waste because it is necessary to understand where to collect waste, which techniques to use to optimize their recycling and, above all, to reduce waste so as not to create accumulations of waste that are, or can become

dangerous; iv) cooperation, as each expert should make his own contribution in solving problems or in designing strategies, in agreement with all the others; v) respect energy sustainability to optimize the management of resources that are limited. The regulation of energy sustainability is fundamental to reduce GHG emissions and to use renewable resources, but the problem is the availability of them and the disposability of new technologies that can help in the regulation of energy production.

The outputs of WP3 analysis, regarding the variation of the variables describing the sea, precipitation, wind and air temperature due to climate change, have been compared with the collected Adriatic regional Strategies. The aim was to understand if the implemented strategies are consistent with the actual impacts of climate change observed and expected in these Regions. In fact, all the changes due to climate change influence current and future human activities, so that adaptation and mitigation Strategies must consider them during the planning. Even if not every Strategy is based on solid climate scenarios and projections, some of the specific indices analysed by WP3 and indicated in the Strategies are similar. Despite that, the WP3 indices and analyses are more specific. However, the list of the possible indices is not exhausted, and additional indices may be needed when preparing next generation of the climate change adaptation strategies.

The outcome of WP3 analysis shows that the sea level increase during the time and will increase also in the middle future. At the same time, also the sea salinity increase, like the sea surface temperature of the sea. Every Region of the project consider this variable and FVG, Primorsko-Goranska County and Šibensko-Kninska County report studies about future projections. In the Strategies has been shown the impacts of sea variables changing i.e. floods and coastal erosion (in every Regional Strategies, except for Dubravačko-Neretvanska County), change in the marine biodiversity (in all Regional Strategies), change in the quality of sea water (in a FVG Strategy).

The precipitation variable is not homogeneous among all the Project regions, but in the future, the trend of seasonal precipitation will change. The changing distribution during the year is a variable examined in all the analysed Regional Strategies and the impacts described are the decrease in water resources availability to drink (in all the Regional Strategies, excepting the Southern Croatian Regional Strategy), for agriculture (in the Northern and Central Regional Strategies and in the Southern Italian Regional Strategies), for fire management (in Marche Region, Šibensko-Kninska County and Apulia Region); dry periods and the consequent soil deterioration (in a FVG Strategy); and more frequent landslides (in FVG and Primorsko-Goranska County).

The same trend is expected for the wind variable. All the analysed Strategies reflect on the wind variable and many of them underline the importance of this variable considering fire management.

The air temperature is increasing and will increase higher in the North and in the Centre Adriatic in the present and in all season and in all regions in the future. In some Regional Strategies, the increasing of the air temperature is often associated with biodiversity change (in all the Strategies analysed), impacts on agriculture and difficulties in fire management (except for the Southern Croatian County).

Another important variable that has been analysed for future projections by WP3 is the tourism. The output is that the potential of tourism activities will change trough the seasons. This variable has been considered also in some Strategies. The impacts of climate change are visible also in the seasonal potential of touristic activities, if some variable change, also the ideal, acceptable and unacceptable condition to practise some activities change during the year and in the future. Tourism potential change has been analysed principally by Šibensko-Kninska County, but every Region realise that the economic impacts of climate change could be more visible analysing the tourism variable in the Adriatic basin.

The variable analysis it is fundamental to the adaptation and mitigation processes and every territory should analyses them: in such way it is possible to evaluate the probable impacts and plan the most suitable actions.

The Strategies analysed at the sub-regional level reflect the other Strategies already described but at the local level. In the sub-regional Strategies, many vulnerable sectors are not involved: northern Sub-regional Strategies did not consider desertification and drought, problems related to emergency and rescue services, foreign policies, responsibility and insurance, and urban settlement; central Strategies did not consider desertification and drought, floods and landslides, and foreign policies; southern sub-regional Strategies did not consider fishery and foreign policies. Climate projections are considered in these Strategies. Furthermore, in Northern Adriatic sub-regional Strategies, scientific organizations are involved but transboundary risks are not considered; also, “green” measures have been adopted by every sub-region. In Central Adriatic, both the Italian and Croatian sub-regions involved scientific and bringing organizations/institutions in the realization of their Strategies. The common measures provided are “grey” and “soft”. The Southern sub-region Strategies analysed, only in Apulia Region, involved scientific and bringing organizations/institutions and provided “grey”, “green”, and “soft” measures.

One of the conclusion remarks of this study is that to reach a common objective it is necessary to cooperate, have a common focus and implement shareable Strategies, but it is not always easy to find a meeting point. In fact, there are regulations, needs and culture that are different in different areas, and must be overcome. So, only knowing the territory, the hazard, the vulnerability factors and in the risks that characterize it, it is possible to put a base to make a good Strategy and every expert should collaborate with another one, in order to optimize time, resources and resilient responses.

Analysing the majority of the Strategies collected, what is striking is that many Strategies have the expiry date in 2020 and very few of them in 2030, 2050 and 2100, but the state of implementation is described in progress. Obviously, it is the beginning of 2020, and there is still remaining time; but it might be interesting to analyse where the planned actions really are; if the goals have been met or we have to wait until the end of 2020 or even more. Probably, the end-dates will be extended, but what are the problems that have to be overcome to reach the objectives and how serious the consequences will be, if we postpone dates?

To answer to this questions and doubts, it is necessary to make in-depth studies to monitor and to evaluate the undertaken actions. Also, it could be a good asset to realize a guideline that every administration could follow to draw up a Strategy, design a linearity in the Strategies structure and being sure that every important point is taken.

In Sea coastal areas of the Adriatic, there is a particular set of climate change impacts, given the natural or anthropogenic hazards and vulnerable factors, so the realization of a Climate Adaptation Menu could be a good help for the areas involved. In this way, every decision maker could search all the information, all the characteristics and all the difference in the state-of-the-art Strategies that we can find in the Adriatic regions. Until now, the approaches have been quite similar through northern, central and southern Strategies, but with the insights of climate studies something could and should change.

In conclusion, it is possible to state that cooperation, insights studies, and a contextual guideline are the main strengths that a Strategy should have.

8 REFERENCES

Adger W.N., Arnell N.W., Tompkins E.L., *Successful adaptation to climate change across scales*,"Global Environmental Change", 2005, **15** (2), pp. 77–86.

Amengual A., Homar V., Romero R., Alonso S., Ramis C., *Projections of the climate potential for tourism at local scales: application to Platja de Palma, Spain*, "Royal Meteorological Society (RMetS)", 2011, available at: https://doi.org/10.1002/joc.2420

Biesbroek G.R., Swart R.J., van der Knaap W.G.M., *The mitigation-adaptation dichotomy and the role of spatial planning*, "Habitat International", 2009, **33** (3), pp. 230–237.

Biesbroek G. R., Swart R. J., Carter T. R., Cowan C., Henrichs T., Mela H., Morecroft M. D., Rey D., *Europe adapts to climate change: Comparing National Adaptation Strategies*, "Global Environmental Change", 2010, **20** (3), pp. 440–450, available at: https://doi.org/10.1016/j.gloenvcha.2010.03.005

European Commission, *White Paper Adapting to Climate Change: Towards a European Framework for Action*, Brussels, 2009.

De Freitas C.R., *Assessment of human bioclimate based on thermal response*, "International Journal of Biometeorology", 1985, **29**, pp. 97–119

European Environmental Agency (EEA), *Climate Change: the cost of inaction and the cost of adaptation*, "EEA Technical Report", n.13, Copenhagen, 2007, , available at: https://www.eea.europa.eu/publications/technical_report_2007_13.

European Environment Agency , *Key observed and projected climate change and impacts for the main regions in Europe*, "EEA Report", n.1, Luxembourg, 2017 available at: https://www.eea.europa.eu/data-and-maps/figures/key-past-and-projected-impacts-and-effects-on-sectors-for-the-main-biogeographic-regions-of-europe-5 (last access: 21/02/2020)

Intergovernmental Panel on Climate Change **(**IPCC), *Climate Change 2001: Impacts, Adaptation and Vulnerability*, "Cambridge University Press", Cambridge, 2001.

Juhola S., Westerhoff L., *Challenges of adaptation to climate change across multiple scales: A case study of network governance in two European countries*, "Environmental Science and Policy", 2011, available at: https://doi.org/10.1016/j.envsci.2010.12.006

Nalau J., Preston B. L., Maloney M. C., *Is adaptation a local responsibility?,* "Environmental Science and Policy", 2015, **48**, pp. 89–98, available at: https://doi.org/10.1016/j.envsci.2014.12.011

Rogelj J., Popp A., Calvin K., Luderer G., Emmerling J., Gernaat D., Fujimori S., Strefler J., Hasegawa T., Marangoni G., Krey V., Kriegler E., Riahi K., Van Vuuren D., Doelman J., Drouet L., Edmonds J., Fricko O., Harmsen M., Havlík P., Humpenöder F., Stehfest E., Tavoni M., *Scenarios towards limiting global-mean temperature increase below 1.5°C*, "Nature Climate Change", 2018, **8** (3), pp. 325-332, available at: https://doi.org/10.1038/s41558-018-0091-3

9 ANNEX

FRAMEWORK OF THE INFORMATION NEEDED FOR THE COLLECTION OF MITIGATION AND ADAPTATION STRATEGIES

GENERAL INFORMATION

In this section, it is asked to provide the General Information regarding the Strategy

Name of the Strategy: _____

1. **Type of Strategy**:
   - ❑ Mitigation
   - ❑ Adaptation

2. **Type of Document that refer to the Strategy (e.g. European Directive, National Strategy, Regional Law...):** _____

3. **Agency that issued the Strategy:** _____

4. **Year of issue:** _____

5. **Geographical area covered by the Strategy (e.g. Croatia, Marche Region,...):** _____

CONTEXT

In this section, it is asked to describe the context in which the Strategy was developed. Several motivating factors explain why governments decide to develop and promote a Strategy. These factors include pressures, compelling information or key events that in combination persuaded governments and other influential stakeholders of the need for action. Whenever it is possible, report the motivating factors behind the Strategy.

6. General objectives of the Strategy: _____

7. Description of the Strategy:_____

8. Motivating factors of the Strategy:

- ❑ Extreme weather events/impacts
- ❑ EU policies
- ❑ Economic costs of inaction
- ❑ Scientific research
- ❑ Media
- ❑ NGO advocacy
- ❑ Private sector interests
- ❑ Recognising opportunities
- ❑ Examples from other countries/regions/...
- ❑ UN Summits/Reports
- ❑ Other

RELEVANCE

In this section, it is asked to point out the science and policy interactions in the development and implementation of the Strategy, by examining: a) the scientific basis around the measures, that is the connection with scientific research on climate system, vulnerability, impacts and disasters; b) the involvement of bridging organizations between science and policy which may either fulfil a coordinating role, provide advice on adaptation policy making, or can be responsible for drafting the Strategy.

9. Is the Strategy based on climate scenarios and projections, taking into account geographical specificities and best available science? _____

10. Is solid assessments of vulnerabilities / climate risks carried out to support the adaptation decision-making process? _____

11. Does the Strategy explicitly take transboundary risks into account, when relevant? _____

12. Does any scientific organization/institution participate in the Strategy? Which ones? _____

13. Does any bridging organizations/institutions between science and policy participate in the Strategy? Which ones? _____

IMPLEMENTATION

In this section, it is asked to assess the "putting into practice" status of the Strategy, whether it is already implemented or is still in progress.

14. Vulnerable sectors and topics involved in the Strategy:

- ❑ Agriculture
- ❑ Biodiversity/Ecosystem conservation
- ❑ Coastal management
- ❑ Communications
- ❑ Desertification and drought
- ❑ Emergency and rescue services
- ❑ Electricity supply
- ❑ Fishery
- ❑ Floods and landslides
- ❑ Foreign policy
- ❑ Human Health
- ❑ Industry
- ❑ Land use
- ❑ Responsibility and Insurance
- ❑ Tourism and leisure
- ❑ Transport and Infrastructure
- ❑ Urban settlement
- ❑ Water resource management
- ❑ Other

15. Time span of the Strategy (from the beginning to the end of the implementation):

- ❑ Short-term (up to 1 year)
- ❑ Middle-term (1-5 years)
- ❑ Long-term (over 5 years)
- ❑ Other

16. Type of envisioned measures

- ❑ "Gray" measures, based on engineering solutions (eg infrastructure construction)
- ❑ "Green" strategies, based on the improvement of ecosystem services (eg tree planting)
- ❑ "Soft" (non-structural) strategies, focused on individual and societal behavior (eg awareness and information, regulation and planning, management, economic and financing)
- ❑ Other

17. Description of the envisioned measures: _____

18. Policy instruments envisaged to implement the Strategy

- ❑ Regulatory
- ❑ Economic/Financial
- ❑ Voluntary
- ❑ Communication-related
- ❑ Other

INTERACTIONS

In this section, it is asked to identify/highlight multi-level interactions in developing and implementing the Strategy

19. Which public and private stakeholders (e.g agencies, institutions, citizens) are involved in the development and implementation of the Strategy? _____

20. What are their roles and responsibilities? _____

21. What kind of communication flow is prevalent?
- ❑ Top-down approach
- ❑ Bottom-up approach
- ❑ Other

COHERENCE

In this section, it is asked to assess if the Strategy is consistent with other EU, national, and regional policies, as well as with other mitigation or adaptation strategies

22. Is the Strategy integrated into new or existing sector policies? Which ones? _____

EFFICIENCY

In this section, it is asked to describe timing, budget, funding and actual costs of the Strategy

23. Foreseen initial-end dates of implementation: _____

24. State of the implementation:
- ❑ Not started
- ❑ In progress
- ❑ Delayed
- ❑ Completed
- ❑ Other

25. Reasons of deviations, if any: _____

26. Funding**:** _____

27. Allocated budget [€]: _____

ACHIEVED RESULTS

In this section, it is asked to indicate the achievements of the broad objectives of the Strategy

28. Are the outcomes of the Strategy evaluated?
- ❑ Yes
- ❑ No
- ❑ Don't know
- ❑ Other

29. How are the outcomes of the Strategy evaluated? _____

30. Has been set up a body in charge of the monitoring and review of the Strategy? Which one? _____

31. What are identified as the main strengths of the Strategy? _____

32. What are identified as the main weaknesses of the Strategy? _____

33. What are the main lesson learned of the Strategy? _____

REFERENCES

In this section, it is asked to enclose links and annexes to the original documents from which the described Strategy is introduced.

34. Link to the Strategy:_____